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14 December 1977

**USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS**

**BIOMEDICAL AND BEHAVIORAL SCIENCES**

**No. 83**

**U S S R**

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E U R O P E**

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## USSR AND EASTERN EUROPE SCIENTIFIC ABSTRACTS

### BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 83

This serial publication contains abstracts of articles and news items from USSR and Eastern Europe scientific and technical journals on the specific subjects reflected in the table of contents.

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## Agrotechnology

USSR

UDC 614.79:614.9

### HYGIENE PROBLEMS IN A VILLAGE IN RELATION TO CENTRALIZING CATTLE RAISING ON A COMMERCIAL BASIS

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1977 signed to press 3 Jan 76  
pp 3-8

AKULOV, K. I., SHITSKOVA, A. P., SAVELOVA, V. A., PAL'TSEV, YU. P.,  
VLODAVETS, V. V., MIRONENKO, M. A., YARMOLIK, I. F., POLOVTSEV, O. P.,  
CHIBURAYEV, V. I., and OKLADNIKOV, N. I., Ministry of Health RSFSR, Moscow  
Scientific Research Institute of Hygiene imeni F. F. Erisman, Saratov  
Scientific Research Institute of Agricultural Hygiene; Moscow Oblast  
Sanepidstation

[Abstract] Special studies lasting more than 2 years were conducted to evaluate the sanitary conditions of the Kuznetsovsky stock raising complex, producing 108,000 cattle per year. Evaluations were made of air and water quality in the surrounding area and the health of the employees who worked at the breeding center. A flow diagram shows the acceptable processes for purifying the farm wastes. It was concluded that current methods of handling the wastes were inadequate and that it will be necessary to develop new scientific and technological methods to improve the sanitary conditions. Figure 1.

USSR

### STUDY OF THE EFFECTS OF NITROGEN FERTILIZER ON PLANTS AND SOILS IN A MULTI-FACTOR EXPERIMENT: COMMUNICATION 3, CHANGING THE CONTENT OF FORMS OF MINERAL NITROGEN IN THE SOIL DURING THE GROWING PERIOD OF BUCKWHEAT AND USE OF NITROGEN BY THE CROP

Moscow AGROKHIMIYA in Russian No 5, May 77 signed to press 14 Jun 76 pp 3-9

KUDEYAROV, V. N., and BASHKIN, V. N., The Institute of Agrochemistry and  
Soil Science, Academy of Sciences USSR, Pushchino, Moskovskaya Oblast

[Abstract] Various applications of nitrogen, phosphorus and potassium fertilizers in nitrogen compounds were studied in test plots after data processing using a polynomial developed by Heady and Dillon. Nitrogen in the soil was very limited. The quantity of unconverted nitrogen in the soil was shown by the polynomial to increase with added nitrogen fertilizer; applications of potassium decreased the amount of unconverted  $\text{NH}_4^+$ . Increased applications of phosphorus brought decreases in unconverted nitrogen in all variants without applications of nitrogen, while where

nitrogen was applied the opposite effect was noted. Increased applications of potassium brought reduction in mineral nitrogen no matter what quantity of nitrogen itself was applied. Increasing doses of potassium without phosphorus at all amounts of nitrogen application reduced nitrogen utilization by the crops, and phosphorus depressed this effect. Thus, results indicated that combinations of the three elements had a significant and positive effect on the interaction of ammonium nitrogen with the soil and its utilization by plants. Tables 5; References 7 (Russian).

USSR

UDC 631.84:631.85:633.11

EFFECT AND RESIDUAL EFFECT OF NITROGEN FERTILIZERS ON SPRING WHEAT HARVESTS AT VARIOUS LEVELS OF PHOSPHORUS SUPPLY

Moscow AGROKHIMIYA in Russian No 5, May 77 signed to press 20 May 76 pp 10-13

BEKETOV, S. A., LAPUKHIN, T. P., and FROLOV, A. P., Buryat Republic Agrochemical Laboratory, Ivolginsk

[Abstract] The study was made on chestnut soils in Ulan Ude Rayon (Orongoyskiy sovkhoz) and measured the quality of spring wheats raised in a crop rotation of fallow followed by three wheat crops. A control plot was given no phosphorus while two test plots received, respectively, 120 and 240 kg/ha of phosphorus. Harvest data for 1971-1973 indicate the beneficial effects and residual effects of the nitrogen fertilizers on the test plots, while phosphorus-potassium or purely phosphorus fertilizers had no significant effects. Nitrogen fertilizer showed up as chemical components of both the grains and the straw of the wheat crops, and some increases in potassium were also observed in the wheat from test plots receiving nitrogen fertilizers. The grain produced had increased protein content. Residual effects of nitrogen fertilizers corresponded to the initial effects. Tables 3; References 3 (Russian).

USSR

UDC 631.84:631.816.12:633.11:631.67

INFLUENCE OF LIQUID NITROGEN FERTILIZERS ON HARVEST AND QUALITY OF WINTER WHEAT UNDER IRRIGATION

Moscow AGROKHIMIYA in Russian No 5, May 77 signed to press 7 May 76 pp 14-17

KORPAN, V. S., and NIKOLAYENKO, A. F., The Novocherkassk Engineering and Developmental Institute, and the Southern Scientific Research Institute for Hydrotechnology and Reclamation, Novocherkassk

[Abstract] Field tests were conducted in Bagayev Rayon of Rostov Oblast to measure effects of various doses of nitrogen fertilizers and periods of application on the yields and quality of winter wheat using the varieties Bezostaya 1, Avrora, and Kavkaz, with irrigation after planting and at the stalking and heading stages of growth. Results indicated that the fall fertilization provided sufficient nitrogen for healthy wintering. The crops that received no spring nitrogen showed a moderate deficiency of the mineral. Where no spring nitrogen application had been done all varieties showed nitrogen deficiencies in the heading stage of growth. Bezostaya 1 plantings retained the spring nitrogen better than the other varieties. Liquid nitrogen fertilizers increased both yields and grain qualities in relation to the number of applications, and the use of nitrogen fertilizers was shown to be economically desirable. Tables 3; References 11 (Russian).

USSR

RESIDUAL EFFECTS OF FERTILIZERS AS A FACTOR FOR INCREASING YIELDS OF GRAIN CROPS IN THE NON-CHERNOZEM ZONE

Moscow AGROKHIMIYA in Russian No 5, May 77 signed to press 31 May 76 pp 40-47

KARTSEV, YU. G., The All-Union Institute for Fertilizers and Agronomical Soil Science, Moscow

[Abstract] The study sought to determine average effectiveness of the first year of fertilization on spring wheat using data gathered by the Geographical Network of the institute, experiments of laboratories in various zones, and bibliographical materials. The tests had been conducted on light and medium podzol soils and gray forest soils, and included 143 short-term tests using spring wheat, barley and oats. The general results of fertilizing were to increase yields by some 20 percent over the control plots. More precise results in specific regions make up the report, including the Tyumen, North Trans-Ural, Latvian and Lithuanian agricultural

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areas. Variations in the effectiveness of nitrogen, phosphorus, and potassium were observed, and in some tests the direct effects of fertilizers on barley and winter wheat were minimal. Soil variations had a direct impact, for in the Byelorussian and Kirov test areas, with light loamy and sandy loam soils, residual effects were not noted. Residual effects of phosphorus and potassium in long-term tests depended on other elements in the soil, crop rotation, biological features of the crops, and the nature of accompanying fertilizers. In loam and clay soils the residual effects lasted well where there was no excessive rain, while in lighter soils the residual effects could be expected only when rainfall was very light. Tables 2; References 21 (Russian).

USSR

UDC 631.811:631.582:(477)

DEPENDENCY OF CROP HARVESTS ON SYSTEMATIC APPLICATION OF FERTILIZERS ON SODDY PODZOL SOILS OF THE WESTERN FOREST ZONE OF THE UKRAINE

Moscow AGROKHIMIYA in Russian No 5, May 77 signed to press 24 May 76 pp 48-52

KUKH, G. M., and PROTsyuk, G. YE., Rovenskaya Oblast Experimental Station

[Abstract] The test was conducted with a crop rotation involving potatoes, winter wheat, flax, silage corn, lupine, winter rye, sugar beets, and oats. Various combinations of manure, nitrogen-potassium-phosphorus, and lime were used for specific crop needs. The investigations showed that systematic fertilizer brought the accumulation of readily available minerals in the soils which had a beneficial effect on yields and crop quality. Meteorological factors and features of the hybrids used were also influential on the crop production. Exclusion of, in turn, nitrogen, phosphorus, and potassium from the mineral fertilizers had negative impact on yields and quality, the greatest decrease coming after elimination of nitrogen. Detailed effects of the individual mineral fertilizers on individual crops are presented. Beyond the combination of N400-P240-K480, further increases in the amounts of those minerals had little additional effect. Tables 2, no references.

USSR

UDC 631.82: (477)

EFFECTIVENESS OF FERTILIZERS ON DARK GRAY GLEY SOIL IN THE CARPATHIAN AREA OF THE UKRAINE

Moscow AGROKHIMIYA in Russian No 5, May 77 signed to press 1 Jun 76 pp 53-57

DMITRIYEVA, YE. I., and LEVENETS, P. P., Ukrainian Scientific Research Institute of Soil Science and Agrochemistry, Khar'kov

[Abstract] Investigations were conducted in 1969-1975 in the Ivanofrankovskaya Oblast, where annual precipitation is about 660 mm, thus causing leaching of carbonates and gleying. These soils were shown to have little free phosphorus, but only contained phosphorus in solution with ammonium and in solid forms that were not usable by plants. Free aluminum in the soil apparently further limited the availability of phosphorus, so that the tests required application of phosphates along with lime to reduce the amount of free aluminum. The results of test growth of barley indicate the advantages gained by these fertilizer applications. Without lime, effective results were obtained applying nitrogen and potassium three years prior to the test plantings when such doses of phosphate fertilizers were high, corresponding to 300 kg of  $P_2O_5$  per hectare. Application of lime to fix aluminum in the soil was particularly effective in combination with other fertilizers. The tests improved yields and such qualities as sugar content of sugar beets. Tables 5; References 5 (Russian).

USSR

UDC 631.41 (470.326)

AGROCHEMICAL CHARACTER OF FLOODPLAIN SOILS IN THE TSNA RIVER BASIN

Moscow AGROKHIMIYA in Russian No 5, May 77 signed to press 17 May 76 pp 80-84

STEPANISHCHEVA, A. N., SHEVCHENKO, G. A., and STEPANISHCHEV, V. K., Voronezh University

[Abstract] The Tsna river is distinguished by a floodplain of 400-600 m with an undulating surface and numerous depressions that do not hinder mechanical soil cultivation. At the highest points in the floodplain light soils have formed, while in lower areas and sinkholes there are marshy soils and peat formations. The Chelnovaya river has a similar nature, and both are examined in the study in terms of specific soil types, minerals contained or lacking, and varieties of plant life found in the floodplain. Less phosphorus was found in the soils of the Tsna than along the Chernovaya, partially due to the presence of iron and aluminum phosphates. Since cultivating of the soils found in these flood plains would lead to excessive erosion, they should be used for pasturage or hay, avoiding plowing. Some should be set aside as watershed conservancy land. Where cultivation is possible, fertilizers including potassium and phosphorus must be applied for root crops and vegetables. Tables 3; References 8 (Russian).

CSSR/USSR

UDC 613.2+613.6:616.45-001.1/.3

NUTRITION AND LABOR PRODUCTIVITY UNDER STRESS

Moscow VOPROSY PITANIYA in Russian No 3, 1977 signed to press 9 Aug 76 pp 22-27

BRODAN, V., KOTSIAN, I., KUHN, E., Institute of Clinical and Experimental Medicine; Therapy Department of the Institute for Advanced Training of Physicians and Pharmacists, Prague

[Abstract] Stressful situations activate the adrenal system, with all the accompaniments of the "flight or fight" syndrome, and affect the concentrations of adrenocorticotropic and other hormones. The body mobilizes nutritive substances and reserves. People may experience a loss in appetite to anorexia, or compensate by overeating, which leads to rapid weight gain. Intensity of work leads to an upset in nitrogen balance and may hasten protein degradation, uric-acid and ammonium-ion levels rise, and levels of amino acids, iron, and thiamine are lowered. Much calcium is lost through perspiration.

Under intense stress, pure glucose may be used as a food source. Under prolonged stress, however, continued use of saccharides can have a noticeably atherogenic effect. Fats can be beneficial to those working in cold climates and detrimental to those working in hot climates. They are recommended for miners and others whose calorie requirements are high. However, high fat consumption before work reduces efficiency.

Regular activity, and regular working, sleeping, and eating habits and patterns tend to reduce stress.

A recommended "stress" diet would include 1 gram of protein per kg of body weight per day, or a bit less, including essential amino acids, 1200-2000 mg per day of calcium, increased thiamine and iron, and polyunsaturated fats. Vitamin C raises productivity, but should not be taken in massive doses before work; it should be replaced as it is lost while working. Figures 3; References 6: 1 Russian, 3 Czech, 2 Western.

USSR

UDC 621.45.019

COMPARATIVE CHARACTERISTICS OF CORTICOSTEROID METABOLISM IN LOWER MONKEYS AND MAN

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian Vol 13, No 3, May/Jun 77 signed to press 15 Jun 76 pp 355-361

GUNCHAROV, N. P., and VORONTSOV, V. I., Institute of Experimental Pathology and Therapy, Academy of Medical Sciences USSR, Sukhumi

[Abstract] Species variation in metabolism of adrenal steroid hormones led the authors to examine the steroid metabolism in monkeys and man. The experimental animals were Macaca mulatta (12), Papio hamadryas (8), Cerco-pithecus aethiops (9), and Erithrocebus patas (10); 11 men (23-37 yrs, 70 kg) were also used. Results of urinary steroid assay (cortisole, cortisone, tetrahydrocortisole with allo-tetrahydrocortisole, tetrahydrocortisone, 20 beta hydroxycortisole, 11-desoxycortisole, tetrahydro-11-desoxycortisole, corticosterone, tetrahydrocorticosterone, and tetrahydro-11-dehydrocorticosterone) revealed a similarity in metabolism of the animals and man, indicating that the monkeys might possibly serve as a model for studies of human metabolism. Substantial interspecies differences were also revealed; M. mulatta and P. hamadryas most closely resemble human findings and are perhaps most suitable for pertinent model studies. Use of the other species would seem unwarranted since they exhibited substantial differences from man in the metabolism of cortisole. Figure 1; Tables 2; References 22: 4 Russian, 18 Western (of these, 3 involved Goncharov).

USSR

UDC 615.917:547.412.133].07:616.36-008.939.6-073.916

INCORPORATION OF 1-<sup>14</sup>C-GLYCINE IN TOTAL PROTEIN AND SUBCELLULAR FRACTIONS OF RAT LIVER TISSUE AT VARIOUS TIMES FOLLOWING ADMINISTRATION OF CARBON TETRACHLORIDE

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian No 1, 1977 signed to press 19 Sep 75 pp 23-26

KOLOBAYEV, V. I., Department of Physiology, Ryazan' Medical Institute imeni I. P. Pavlov

[Abstract] The incorporation of 1-<sup>14</sup>C-glycine into total protein of liver hemogenate during prolonged administration of  $CCl_4$  is found to diminish progressively. This suggests a lowering of the biosynthesis of proteins

in the liver cells. Such inclusion in nuclear and mitochondrial fractions separated from the liver on the fifth day following the start of administration of  $CCl_4$  is found to increase, and this indicates a strengthening of both mitochondrial biogenesis and of functional activity of liver cell nuclei, this being in response to damage of the endoplasmic reticulum. Reduction in the rate of incorporation of a radioactive tag in the nuclear fraction occurs earlier than such incorporation in the case of the mitochondria. With prolonged administration of  $CCl_4$ , the blood serum preserves a high activity of alanine aminotransferase and of aspartate aminotransferase. These results were obtained from tests on 111 white rats, to which a 1:1 solution of  $CCl_4$  was administered subcutaneously. It is noted that the results are in direct contradiction to those reported by BUSSUTIL in 1972, where no change in the activity of ALAT and ASAT in the blood serum is indicated. Table 1; References 19: 10 Russian, 9 Western.

Biophysics

USSR

UDC 577.391

EXPERIMENTAL INJURIES PRODUCED BY PULSED LASER IRRADIATION IN YOUNG PIGS

Moscow IZVESTIYA AKAD. NAUK SSSR, SER. BIOL. in Russian No 4, 1977 signed to press 5 Oct 76 pp 582-588

ARAKELYAN, L. A., Institute for the Advanced Training of Physicians, Leningrad

[Abstract] Two-day-old piglets were exposed to focused and unfocused pulsed laser irradiation (energy 980 to 1830 j, density 5300 to 91,670  $j/cm^2$ ) in different parts of the body. Macroscopic and histological examination of the skin, bones, liver, kidneys, spleen, cranium, and brain of the animals who exhibited no visible signs of life at the end of irradiation revealed in most of the organs the changes characteristic of those produced by an electric current or high temperature - charring, holes of various shapes, hemorrhages, distortion of cell nuclei, empty blood vessels, etc. Direct irradiation of the heart, lungs, kidneys, spleen, and liver removed from the dead animals resulted in even more severe lesions.

Figure 1; Table 1; References 9: 6 Russian, 3 Western.

USSR

UDC 576.858.9:576.851.42

THE EFFECT OF A PERMANENT HOMOGENEOUS MAGNETIC FIELD ON BACTERIOPHAGE 62 OF ERWINIA CAROTOVORA

Kiev MIKROBIOLOGICHNYY ZHURNAL in Ukrainian No 1, Jan/Feb 77 signed to press 27 Apr 76 pp 68-70

GRIGORYAN, YU. A., KOLESNYK, L. V., SPIVAK, M. YA., and BOYKO, A. L., Institute of Microbiology and Virology, Academy of Sciences, Ukrainian SSR

[Abstract] It was established that the effect of a permanent homogeneous magnetic field, varying in intensity from 2,000 to 29,000 Oe. is to secure a significant reduction in the infectivity of viral preparations so treated. Electron microscopic examination revealed morphological-structural changes in phage particles as a result of treatment with a magnetic field. Figures 2; References 7: 6 Russian, 1 Western.

Environmental and Ecological Problems

USSR

UDC 611.44:599.32:591.044

FUNCTION OF THE THYROID GLAND OF RODENTS UNDER CONDITIONS OF A HOT CLIMATE

Leningrad ZHURNAL EVOLYUTSIONNOY BIOKHIMII I FIZIOLOGII in Russian Vol 13, No 3, May/Jun 77 signed to press 30 Jun 76 pp 350-355

AKHMETOV, I. Z., TURAKULOV, YA. KH., and KHAYRUTDINOV, KH. SH., Laboratory of Animal Physiology, Institute of Zoology and Parasitology, Academy of Sciences UzbekSSR, Tashkent

[Abstract] The specific conditions of the hot climate of Central Asia are known to cause a pronounced and multifaceted effect on the activity of the nervous, thermoregulatory, cardiovascular, digestive, secretory, and other systems of the body. The authors have carried out a comparative study of the influence of solar-heat action upon functioning of the thyroid in rodents which were adapted to various ecological conditions. The rodents included the Rhombomys opimus (63), the Spermophilopsis leptodactylus (45), the Citellus fulvus L. (66), and white rats (68). The functional activity of the thyroid was measured by I-131 absorption and protein-bound, radioactive, iodine in the thyroid and blood. It was found that heat, combined with exposure to the sun's radiation, significantly depressed the absorptive and secretory activity of the thyroid. Animals indigenous to the arid zones (the first two rodents cited) were somewhat more resistant to the experimental challenge and were able to regulate their metabolism more rapidly than laboratory animals. The character of the daily ecological milieu of the animals was reflected in their response to the hot climate. Tables 2; References 38: 27 Russian, 11 Wester.

USSR

UDC 612.172.6-06:612.275.1

CHANGE IN ULTRASTRUCTURE OF RAT MYOCARDIUM UNDER THE INFLUENCE OF A 12-MONTH ADAPTATION TO MOUNTAIN ALTITUDE

Moscow BYULLETN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 84 No 7, Jul 77 signed to press 14 Jan 77 pp 109-112

ZHAPAROV, B., and MIRRAKHIMOV, M. M., academician, Academy of Sciences Kirgiz SSR, Electron Microscopy Division, and Problem Laboratory, Kirgiz Medical Institute

[Abstract] Lack of data on the morphofunctional features of the myocardium due to rather long (12 months) adaptation to the hypoxia of high mountains induced the authors to undertake the title study. White rats, at age 4-6 months, were taken to the Tuya-Ashu mountain pass (3200 M) and maintained

there for 12 months, then decapitated. Morphometric, light-optic, electron microscopic, and electron cytochemical studies of the rat myocardium revealed development of hypertrophy mainly in the right, and partially in the left, ventricles. The majority of the cardiomyocytes of both ventricles displayed hyperplasia and hypertrophy of individual organelles, especially the mitochondria. Succinate dehydrogenase activity in the mitochondria, in the animals adapted to the mountain altitude, was higher than that in control animals (these were rats of the same age which had been maintained in the city of Frunze, 760 M altitude). The developed hypertrophy of the ventricles involves hyperplasia and hypertrophy of the intracellular structures; intracellular metabolism is intensified and reflects compensatory-adaptive response of the heart to the altitude hypoxia. Figures 2; References 11: 7 Russian, 4 Western.

Epidemiology

USSR

UDC 616.988.75-036.1+616.988.75-091

CLINICAL AND PATHOLOGICAL CHARACTERISTICS OF INFLUENZA IN 1974-1975

Moscow KLINICHESKAYA MEDITSINA in Russian No 5, 1977 signed to press  
16 Jul 76 pp 80-86

MITEREV, YU. G., KUBANTSEVA, I. V., SOLOV'YEVA, T. I., KOZINETS, G. I.,  
POSTRIGACH, N. D., and BORZOVA, L. V., Central Institute of Hematology  
and Blood Transfusion; Moscow Consolidated Municipal Hospital No 81

[Abstract] The course of influenza in 75 of 80 patients examined during the 1974-1975 was severe or moderately severe and characterized by the development of toxicosis, early supervention of pneumonia with abscess formation, and manifestations of the hemorrhagic syndrome. Biochemical studies of the functioning of various systems and organs revealed cardiac arrhythmias, dysproteinemia, hypercoagulability, and decreased electrophoretic mobility of erythrocytes and platelets. Besides the typical changes caused by influenza (paresis of pulmonary blood vessels, stasis of capillaries, hyaline thrombi in the capillaries, numerous hemorrhages, edema) and the secondary bacterial infection (bronchopneumonia, thoracic empyema) there were also infectious-allergic changes (acute glomerulonephritis, acute lymphadenitis of the bifurcational, cervical, and other lymph nodes). Figures 1; Tables 2; References 13: 10 Russian, 3 Western.

USSR

UDC 576.858.77

DETECTION OF NUCLEAR POLYHEDROSIS LATENT VIRUS CARRIERS IN NATURAL  
POPULATIONS OF LYMANTRIA DISPAR L. (LEPIDOPTERA: LYMANTRIIDAE)

Kiev MIKROBIOLOGICHNYY ZHURNAL in Ukrainian No 1, Jan/Feb 77 signed to  
press 5 Apr 76 pp 61-64

KARPOV, A. YE., KARABASH, YU. A. and ZOLOTARENKO, A. I., Institute of  
Molecular Biology and Genetics, Academy of Sciences Ukrainian SSR, and the  
Ukrainian Scientific-Research Institute of Plant Protection

[Abstract] Heating of the larvae of the 3d and 4th instars (Kiev population) to 45°C for a period of 60-120 min., and a prolongation of the hibernation of Lymantria dispar eggs (Azerbaydzhan population) to 30 days, led to induced nuclear polyhedrosis, and hence to detection of virus-carriers in a virtual majority of individuals in these two natural populations. The results obtained indicate the wide distribution of carrier capability for the latent virus of nuclear polyhedrosis of some populations of the gypsy moth larvae. The authors recommend a search for effective low-toxic chemical inducers which will activate the latent nuclear hedrosis virus in a majority of individuals of natural populations of the gypsy moth.

Tables 2; References 18: 5

Russian, 13 Western.

USSR

PROGRAM OF STUDIES ON THE EFFECTIVE USE OF COOLING WATERS FROM POWER STATIONS  
FOR FISH HUSBANDRIES

Kiev VISNYK AKADEMIYI NAUK UKRAYINS'KOYI RSR in Ukrainian No 4, Apr 77 pp 3-4

[Abstract] These studies will be conducted during 1976-1980 at eight institutes of the USSR Academy of Sciences, Ukrainian Scientific Research Institute of Fisheries, Ukrainian branch of the All-Union Scientific Research Institute of Mixed Feed of the USSR Ministry of Procurement, and Kiev section of the Fish Industry Programs of the USSR Ministry of Fish Industry. The aim of these studies is the development of scientific approaches and methods for cultivation of fish in warm waters from atomic and thermoelectric power stations, selection of the most profitable fish species for these waters, production of a broad variety of the mixed granulated feed for fishes, and planning and designing the fish husbandries. Nine thematic problems will be investigated in the course of these studies, with 45 specific aspects concerning the utilization of cooling waters from power stations for the fish cultivation purposes. In 1975, the cooling waters from power stations amounted to 50 percent of all waste waters in the USSR, and this percentage will be greatly increased by 1990. In order to harvest 1.5 million quintals of fish from warm waters of power stations, 350 ha of cooling reservoirs is required, as opposed to 200,000 ha of ordinary fish ponds. This is due to the water temperature which can be kept in cooling reservoirs at not lower than 20°C for 6-8 months and longer. The water temperature in ordinary fish ponds in the European part of the USSR stays at 20°C for only 3.5-4 months. This temperature is closely related to the growth of fishes. This means that if the water is kept longer at 20°C the growing period of fish can be extended. Investments in building the fish husbandries with the use of cooling water from power stations is twice as low as compared with ordinary ponds.

Immunology

USSR

ACTION OF POLYSACCHARIDE COMPLEXES OF ACTINOMYCETES ON FORMATION OF IMMUNE BODIES IN VACCINATION AGAINST BRUCELLA (BRUCELLA ABORTUS)

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR in Russian No 3, 1977  
pp 45-46

FILIPPOVA, T. V., RAZUMOVSKIY, P. N., YEFREYEV, V. N., and PUSHKARENKO, YA. YE.

[Abstract] The authors have examined the toxicity of bacterial polysaccharides which has inhibited their use in medical practice. Work was done at the Section of Microbiology of the Academy of Sciences Moldavian SSR (in Kishinev), the Institute of Toxicology (in Kiev), and the Scientific Research Veterinary Station (in Odessa). The polysaccharides complexes were derived from *Actinomyces griseus* 20, and *Act. canosus* 89 by various extraction methods, and their toxicity tested in Wistar rats; the complexes decreased protein metabolism, and decreased activity of transamination enzymes. Weight of the heart, lungs, spleen, liver, and kidneys were increased by several of the complexes. Simultaneous administration to guinea pigs of the polysaccharide complexes and of microbial bodies of *B. abortus* 104-M strain raised the level of antibodies in the blood in comparison to the control group which did not receive the complexes. The highest level of antibodies was seen 24 hrs after immunization. In this period is seen the largest substantial difference between the titer of agglutinins in the experimental and control groups. Tables 2; References 1 (Russian).

## Industrial Microbiology

USSR

UDC 576.31:576.851

PLASMIDS AND SPORE-FORMING BACTERIA. I. SPORE-FORMATION AND COLONIAL AND MORPHOLOGICAL VARIATIONS IN PLASMID AND PLASMID-NEGATIVE STRAINS OF BACILLI

Moscow GENETIKA in Russian No 7, 1977 signed to press 17 Dec 76 pp 1233-1236

LUKIN, A. A., ALIKHANYAN, S. I., DANILEVICH, V. N., YERMAKOVA, L. M., and KOZ'MINA, L. M., All-Union Scientific Research Institute of Genetics and Breeding of Industrial Microorganisms, Moscow

[Abstract] The relationship between spore formation, colonial and morphological variations, and plasmid formation was studied in several strains of three different species of spore-forming bacteria - *Bacillus pumilus*, *Bacillus subtilis*, and *Bacillus brevis* - grown on Hottinger's broth and Hottinger's agar. Spore formation was found to be very low in the plasmid strains but normal in the plasmid-negative strains. The insignificant spore formation by the plasmid strains of *B. pumilus* is ascribed not to inhibition but to the effect of plasmids on the process. Plasmids apparently repress sporogenesis in *B. pumilus*. Colonial and morphological variations were observed only in the plasmid-negative strains which formed round, smooth, mucoid, and flat colonies. These findings suggest that spore formation, like colonial and morphological variations, is controlled by genes. It seems that plasmids can modify their phenotypic expression. Table 1; References 15: 1 Russian, 14 Western.

USSR

UDC 620.193.82

STUDY OF THE FUNGI-RESISTANCE OF CERTAIN ROAD-BUILDING MATERIALS

Kiev MIKROBIOLOGICHNYY ZHURNAL in Ukrainian No 1, Jan/Feb 77 signed to press 6 Feb 76 pp 84-87

KHIMERIK, T. YU., and KOVAL', E. Z., Kiev Highway Institute, and Institute of Microbiology and Virology, Academy of Sciences Ukrainian SSR

[Abstract] Published data on the destructive action of microscopic fungi acting on highway materials are virtually lacking. This action, however, is becoming increasingly important under present conditions, owing to the adaptability of fungi to a number of industrial products, which are either used directly in highway construction, or are likely to appear in close proximity to highways, in the form of soils, industrial wastes, chance deposition from trucks and trains, and the like. Under controlled conditions, the authors tested the fungi-resistance of a number of materials associated with highway construction. These included hydrolyzed lignin of

the Zaporozh'ye and Bobruysk plants, lime powder, the BND 90/130 brand of petroleum asphalt (lignin and bitumin), and fine-graded bituminous concrete. All proved nonresistant to the fungi tested (*Aspergillus flavus*, *A. Niger*, *Trichoderma viride* and some others). The fungi established themselves in surprisingly short times, and propagated with destruction of the material of the samples. "Schedules" of the development of colonies are given. No specific recommendations are made.

USSR

UDC 582.28 (47+57)

MAIN RESULTS OF RESEARCH ON INDUSTRIAL MYCOLOGY IN THE USSR FROM 1971 TO 1975 AND PROSPECTS FOR THE FUTURE

Leningrad MIKOLOGIYA I FITOPATOLOGIYA in Russian No 3, 1977 pp 254-259

[Abstract] Research is conducted on industrial mycology throughout the USSR in three main areas: (i) study of biologically active substances for use in medicine, agriculture, and several branches of industry; (ii) cultivation of fungi for food and fodder protein; (iii) protection of various materials against injury by fungi. Encouraging progress was made in all three areas during the period under review. A number of new antibiotics, enzymes, and alkaloids were obtained and some success was achieved in growing mushrooms and yeasts on an industrial scale. Significant advances were also made in studying the species diversity and ecological and physiological properties of fungi that attack paper, rubber, fabrics, plastics, petroleum products, etc., and in improved methods of testing fungus-resistant materials, and in developing active fungicides and elucidating their action on the fungal cell.

## Industrial Toxicology

USSR

UDC 613.63:061.63(477)"1976"

WORK OF THE INTERSECTIONAL SESSION ON "MAIN PATTERNS OF INFLUENCE OF CHEMICAL FACTORS OF THE ENVIRONMENT ON THE BODY" AT THE NINTH UKRAINIAN CONGRESS OF HYGIENISTS AND SANITARY PHYSICIANS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 4, Apr 77 pp 58-59

KAGAN, YU. S., and SASINOVICH, L. M., Kiev

[Abstract] The Ninth Ukrainian Congress of Hygienists and Sanitary Engineers was held at Donetsk on 26-28 May 1976. A number of interesting subjects were discussed, including the introduction of hygienic standards for chemical substances, improvement of the qualitative criteria of harmfulness, probabilistic establishment of threshold doses and concentrations, the development of principles of setting hygienic standards for chemicals with consideration of their complex arrival in the body by various routes, setting standards for substances having a remote effect, and the extrapolation to man of data obtained in experiments on animals.

USSR

UDC 615.478.6 616.632.16-074-71

EXPERIMENT IN THE APPLICATION OF THE SOVIET EF U-1 FLUORINE-SELECTIVE ELECTRODE FOR FLUORINE DETERMINATION IN URINE

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 4, Apr 77 signed to press 31 May 76 pp 55-57

GOLOVANOVA, L. A., Institute of Labor Hygiene and Occupational Diseases, Sverdlovsk

[Abstract] A block diagram of an instrument containing the Soviet EF UF-1 fluorine-selective electrode is presented. Such an instrument was constructed and tests conducted to compare it with an instrument containing an "Orion" fluorine-selective electrode. Practically equivalent results were obtained. Figure 1; Tables 2; References 6: 3 Russian, 3 Western.

USSR

UDC 613.63-07 621.3.032

USE OF SEMICONDUCTOR SENSORS TO DETECT HARMFUL ORGANIC IMPURITIES IN THE AIR OF PRODUCTION PREMISES

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 4, Apr 77 signed to press 18 Jun 76 pp 53-54

CHAUSOVSKIY, G. A., Branch of the Institute of the Industrial and Sanitary Purification of Gases, Zaporozh'ye

[Abstract] The basis of the use of semiconductor sensors is their property of varying their electrical conductivity under the influence of chemical absorption, which is a result of contamination of the surface during chemical absorption of an investigated gas and the Fermi level shift occurring in that case. The reported work was undertaken to determine whether semiconductor sensors can be used to detect harmful organic impurities in the air of production premises. A simple system which included an absorber and a moisture analyzer performed the desired function. Figure 1; References 3 (Russian).

USSR

UDC 616.24-003.662 616.24-003.662.06 616.24-002.5] 622(574)

COURSE OF SILICOSIS AND RISK OF CONTRACTING TUBERCULOSILICOSIS IN MINERS OF KAZAKHSTAN

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 4, Apr 77 signed to press 20 May 75 pp 36-39

RUBILINA, E. E., Kazakh Institute of Tuberculosis, Alma-Ata

[Abstract] The course of silicosis at mining enterprises of Kazakhstan has changed for the better in the last decade. As a result of chemical prophylactic measures its incidence has decreased and complication into tuberculosis and the development of calcification are less frequent. The development of tuberculosis in patients with silicosis depends on the SiO<sub>2</sub> concentration, which can increase the risk by a factor of 5 or 6, and on intrathoracic residual changes, the carriers of which were affected 28 or more times as frequently as the others. With regular chemical prophylaxis the risk of tuberculosilicosis can be reduced as much as 60 percent. Table 1; References 15: 11 Russian, 1 Hungarian and 3 Western.

USSR

UDC 617-001.34-085.331

TREATMENT OF VIBRATION DISEASE WITH PRODIGIOSANUM

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 4, Apr 77 signed to press 15 Nov 76 pp 32-36

BALAN, G. M., and CHERKASSKAYA, R. G., Kazakh Institute of Labor Hygiene and Occupational Diseases, Karaganda

[Abstract] Patients with vibration disease resulting from years of exposure to jackhammer vibration were administered prodigiosanum (a biological stimulator, a bacterial lipopolysaccharide). After 2 or 3 weeks pain decreased and muscular strength increased, cyanosis and pallor of the skin of the hand were reduced and capillary circulation improved. Immuno-logical factors and intraleucocytic enzymes were also activated.

Tables 2; References 8 (Russian).

USSR

UDC 616-001.34-057-036.865

QUESTIONS OF WORKING CAPACITY AND REHABILITATION OF PATIENTS WITH VIBRATION DISEASE

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 4, Apr 77 signed to press 31 May 76 pp 28-32

MODEL', A. A., and VAYNSHTEYN, N. I., Institute of Labor Hygiene and Occupational Diseases, Machine-Building Plant Medical and Sanitary Unit, Kiev

[Abstract] Patients with various clinical manifestations of vibration disease resulting from local high-frequency and low-frequency vibration (riveters and chippers respectively) were examined. The results of the conducted investigations reveal five factors having a substantial influence on the expressiveness of vibration disease: 1) the age at which the worker started to work under conditions involving exposure to vibration, 2) the length of the disease, 3) disorders of the spinal osteo-articular system, 4) neurotic factors developing later and 5) accompanying non-occupational diseases.

USSR

UDC 616-001.34-036.8-07:[616.839+616.45]-008.1

SYMPATHICOADRENAL FUNCTION IN THE LATE STAGES OF VIBRATION DISEASE

Moscow KLINICHESKAYA MEDITSINA in Russian No 5, 1977 signed to press  
21 Jun 76 pp 77-80

KRASAVINA, T. S., VOLKOVA, T. N., and GORNIK, V. M., Central Scientific Research Institute of Disability Evaluation and Organization of Work for the Handicapped, Ministry of Social Welfare RSFSR, Moscow

[Abstract] Analysis of the urine of 96 workers 40 to 50 years of age whose jobs involved exposure to general vibration for 6 to 10 years revealed a dissociation in the excretion of catecholamines. Whereas the amount of epinephrine excreted was approximately double that of healthy persons, the excretion of norepinephrine was one-half to one-third as much. These changes occurred mostly during the first 5 years of work. Study of the medical histories of workers 5 to 10 years after they were transferred to jobs in which they were not exposed to vibration showed that the excretion of epinephrine remained high (more than twice the normal level) while that of norepinephrine was still abnormally low. Thus, the changes in catecholamine metabolism in persons suffering from vibration disease persist for many years, an indication of the inadequacy of the compensatory mechanisms. Tables 2; References 11: 9 Russian, 2 Western.

USSR

UDC 613.645

STANDARDIZING INFRARED RADIATION IN INDUSTRY

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1977 pp 29-32

SHLEYFMAN, F. M., professor, and MARCHENKO, L. A., candidate of medical science, Kiev Scientific Research Institute of Industrial Hygiene and Occupational Diseases

[Abstract] Automation has increased the exposure of employees to infrared (IR) radiation. Experimental studies were carried out to determine the effects of IR on the body. These showed that under a regime of exposure to 1, 2, or 3  $\text{kcal/cm}^2 \cdot \text{min.}$ , for 30 minutes, the body temperature increased by 0.2 to 0.6°C and the temperature of the skin by 1.8 to 2.4°C. Examination of the condition of the different physiological functions of the body shows that the biological effects of IR appear 5-10 minutes after exposure and are related to the intensity of the radiation. The following guidelines were suggested: less than 0.5  $\text{kcal/cm}^2 \cdot \text{min.}$ , no restriction; 0.5-1.0  $\text{cal/cm}^2 \cdot \text{min.}$ , maximum length of single exposure 15-20 minutes, cumulative exposure

at this level, as % of the work shift less than 70%; 1.0-3.0 cal/cm<sup>2</sup>·min, 5-10 minutes and 50%; greater than 3 cal/cm<sup>2</sup>, 5 minutes and 30-40%.  
Figure 1; References 1 (Russian).

USSR

UDC 613.646-059:613.644

COMBINED EFFECT OF TEMPERATURE, RELATIVE HUMIDITY, NOISE, AND VIBRATION  
ON THE HUMAN BODY

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1977 signed to press 30 Jul 76  
pp 99-101

BUKHARIN, YE. A., and SOLOV'YEV, A. V., candidates of medical sciences

[Abstract] The title study was carried out for the following range of parameters: temperature, 22-32°C; relative humidity, 55-80%; noise level 75-94 db; and 0.2 mm vibration at 30 hertz. The reaction in most cases was for the temperature of both the body and the skin to increase, although the temperature of the latter occasionally decreased. The strongest physiological reaction was provoked by the most stressing conditions; the skin temperature increased by 0.4 to 1.4°C and that of the body by 0.5 to 0.6°C. Tables 2; References 6 (Russian).

Microbiology

USSR

ANTIMICROBIAL ACTIVITY OF INDIVUAL PHOSPHOLIPIDS OF ACTINOMYCES CANOSUS 89

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR in Russian No 3, 1977  
pp 42-44

KOVAL'CHUK, L. P., KRETSU, L. G., YADOVINA, V. N., and BURTSEVA, S. A.

[Abstract] The authors describe separation of total lipids of *Act. canosus* 89 by column chromatography and subsequent tests of the antibiotic activity of total and individual phospholipids. The latter, which were identified with specific reagents, included neutral lipids and the oxidation products, fatty acids: polyglycerophosphatides; phosphatidylethanolamines; a mixture of phosphatidylcholine and lysophosphatidylcholine, and phosphatidylserine. These were tested for antimicrobial activity against *Staph. aureus* 209, *B. subtilis* 6633, *E. coli* 113-3, and *E. coli* M-17. All fractions were antimicrobial. Comparison of this property of the total and individual phospholipids indicated that the purification and separation of phospholipids promote a significant increase in activity against *Staph. aureus* and *E. coli* 113-3 and a small decrease against *B. subtilis* 6633. References 9: 8 Russian, 1 Western.

USSR

SYMPTOMS OF VIRUS DISEASES OF WINTER WHEAT IN MOLDAVIA

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR in Russian No 3, 1977  
pp 85-86

VARGIN, G. B., and GRINBERG, SH. M.

[Abstract] Viruses, along with pathogenic fungi and bacteria, have been a serious danger to winter wheat in recent years in Moldavia, but relatively few reports on virus diseases of wheat there have been published. The authors initiated their studies on the latter problem in 1973-74 in various agroclimatic zones of the republic. They have found and described i) winter wheat mosaic, which appears in two forms--mosaic, and rosette-form; ii) wheat streak mosaic; iii) pale-green dwarf wheat; and iv) yellow dwarf of barley-on-wheat. These virus diseases of winter wheat can be differentiated by characteristic symptoms; plant-indicator, and electron microscopy methods will be used to provide a more precise diagnosis. No references.

USSR

NEW DISEASE OF SAGE IN MOLDAVIA

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR in Russian No 3, 1977 pp 84-85

KHRIPUNOVA, E. F.

[Abstract] Many years of study of microflora of essential-oil plants in Moldavia have uncovered the soil fungus *Thielaviopsis basicola* (Berk. et Br.) Ferr. on sage which it has affected with black root rot, a new disease of this plant. This fungus is already known to damage many plants, but had not yet been found on sage. The author describes the fungus and the development of the disease as seen under field conditions, in spring-summer conditions. Figures 2; References 4: 2 Russian, 2 Western.

USSR

UDC 576.851.45.097.29

SPHEROPLASTS OF PLAGUE MICROBE STRAINS FROM TRANSCAUCASIAN UPLAND AND THEIR CAPACITY FOR PESTICIN SYNTHESIS

Moscow ANTIBIOTIKI in Russian No 7, 1977 signed to press 26 Jan 77 pp 634-639

GRAMOTINA, L. I., and ROZANOVA, G. N., Division of Plague and Cholera Microbiology (head: Yu. M. Yelkin), Scientific Research Antiplague Institute of the Caucasus and Transcaucasus, Stavropol'

[Abstract] Spheroplasts of plague microbe were isolated from samples collected in the Transcaucasian Upland and Upland Altay, marmot variety; agar prepared from the enzymatic hydrolysate of casein, treated with lithium chloride, was used. Cell wall reamins were present in the spheroplasts; they were viable, sensitive to osmotic shock and retained their sensitivity to the specific bacteriophage and pesticins. Spheroplasts of plague microbe strains from the Transcaucasian Upland and "classical" plague strains were found capable of producing pesticin. Pesticin synthesis by Transcaucasian Upland spheroplasts intensified with higher lithium chloride content in the medium. The inhibition zones formed by the pesticin of plague microbe spheroplasts from the Upland Altay and the marmot variety shrunk with increased lithium chloride content in the nutrient medium. The activity spectrum of pesticins from the spheroplasts of the plague microbe in the Transcaucasian Upland, marmot and sandwort samples was broader than the activity spectrum of the rod-shaped forms of these strains. Indicator properties with respect to the pesticins of spheroplasts from the Transcaucasian Upland and similar strains were established for the strains of plague microbe of the marmot and sandwort varieties. Table 1; References 6: 4 Russian, 2 Western.

USSR

UDC 576.851.49 (Salmonella) .097.22:615.33

STRUCTURE OF ANTIBIOTIC RESISTANCE IN SALMONELLA OCCURRING IN THE TRANS-CARPATHIANS

Moscow ANTIBIOTIKI in Russian No 7, 1977 signed to press 15 Feb 77 pp 613-617

GRISHCHENKO, R. I., and SAKAL', N. N., Transcarpathian Oblast Sanitary-Epidemiological Station

[Abstract] The salmonellosis morbidity level in the Transcarpathians in 1974-1975 increased in several locations by a factor of 8 to 10 as compared with the 1971-1972 level. The resistance of 1280 *Salmonella* strains of six serological types (nearly 90 percent of the strains were *S. typhimurium*, and the other types were *S. enteritidis*, *S. heidelberg*, *S. cholerae suis*, *S. reading* and *S. newport*) to 24 antibacterial preparations made in Czechoslovakia (Lachema Plant) was analyzed: benzylpenicillin, ampicillin, carbenicillin, oxacillin, cephaloridine, erythromycin, oleandomycin, lincomycin, chloramphenicol, tetracycline, streptomycin, neomycin, kanamycin, hentamycin, polymyxin, colistin, furadantin, nalidixic acid and some other agents. Predominant among resistant *salmonella* strains are those with four to eight resistance determinants: they account for 87.8 percent of resistant cultures. *Salmonella* strains were further classified within serotypes as to the number of resistance determinants, in percentages. *Salmonella* was shown to have become more resistant to streptomycin, tetracyclin, levomycetin, monomycin and neomycin. Epidemiological analysis of salmonellosis morbidity in the region showed that its increase came mainly from the circulation of polyresistant *S. typhimurium* strains among preschool-age children. Tables 3; References 9 (Russian)

USSR

UDC 582.288(477)

OCHROCONIS TSHAWYTSCHAE (DOTY ET SLATER) COMB. NOV.

Kiev MIKROBIOLOGICHNYI ZHURNAL in Ukrainian Vol 39, No 3, 1977 signed to press 30 Jul 76 pp 303-306

KIRILENKO, T. S., and AL'-AKHMED, Institute of Microbiology and Virology, Academy of Sciences of the Ukrainian SSR

[Abstract] *Ochroconis tshawytschae* was isolated by the authors for the first time in Ukraine from tomato roots diseased with a rot. As opposed to an earlier classification (it was classified as belonging to the genus *Heterosporium*), the authors classified it into the genus *Ochroconis* and

named it *Ochroconis tshawytschae* (Doty et Slater) Kiril. et All-Ahmed, comb. nov. When cultivated in neutralized agar brewing wort at 24-26°C, the fungus reaches 42 mm in diameter in 14 days; in acidified (pH 4.3) agar brewing wort it reaches only 36 mm in diameter in 25 days. On potato-dextrose agar, Chapek medium agar and glucose-pepton agar, the fungus colonies grow to 44, 45 and 44 mm in diameter., respectively, in 25 days. The fungus produces the largest number of spores on potato-dextrose agar and the lowest on glucose-pepton agar. Seven species of the genus *Ochroconis* are briefly described, along with morphological features of *O. tshawytschae*. Figures 1; References 11: 1 Russian, 10 Western.

USSR

UDC 619:576.809.33

#### NUTRITIVE MEDIA FOR THE CULTIVATION OF BACTERIA

Moscow VETERINARIYA in Russian No 5, 1977 pp 102-103

NIKITINA, V. A., KHAYERTYNOV, S. KH., KHAKIMOVA, K. M., TROSHINA, T. A., and SAVARDINOVA, A. K., Kazan' Veterinary Institute

[Abstract] In an attempt to determine inexpensive substrates for the cultivation of bacteriological media as substitutes for the high-cost Hottinger medium, a comparative study was conducted of the properties of three media types produced from hydrolysates of inexpensive protein raw materials, namely a cabbage-casein-yeast medium, a 0.5-1% aqueous solution of lactalbumin hydrolysate, and a 0.5-1% aqueous solution of cattle-placenta hydrolysate. With respect to chemical composition the three media turned out to differ little from the generally accepted Hottinger medium, but the cost of the cabbage-casein-yeast medium amounted to 50-60 kopeks per liter, that of the placenta medium 20-25 kopeks per liter, and that of the lactalbumin hydrolysate 6-8 kopeks per liter, whereas a liter of the Hottinger medium, prepared from beef, cost 2-3 rubles. Results of tests conducted on the properties of the investigated media, Hottinger agar serving as the control, showed that with prolonged cultivation (ten successive passages and more), bacteria grown on the tested media as well as on the control medium retained the initial morphological, cultural, and biochemical properties, a virulence for white mice, resistance to antibiotics (to biomycin, neomycin, tetracycline, streptomycin, penicillin, and sensitivity to colicins. Tables 1.

USSR

UDC 577.1:576.8

PHYSIOLOGICAL AND BIOCHEMICAL CHARACTERISTICS OF GROWTH AND TECHNIQUE  
OF CONTINUOUS CULTURE OF HYDROGEN BACTERIA

Moscow IZVESTIYA AKAD. NAUK SSSR, SER. BIOL. in Russian No 4, 1977 signed  
to press 16 Aug 76 pp 541-550

TERSKOV, I. A., GITEL'ZON, I. I., SID'KO, F. YA., FEDOROVA, YA. V.,  
KESLER, T. G., and BATUTIN, M. YE., Institute of Physics, Siberian Branch  
of the Academy of Sciences USSR, Krasnoyarsk

[Abstract] The article reports the principal results of a study of *Hydrogenomonas eutropha* Z-1 in which attention was focused mainly on the technique and technology of culturing the bacteria. Several of the apparatus tested are described. The specific growth rate of the micro-organisms was independent of residual concentrations of sulfur, phosphorus, potassium, and magnesium in the medium. The synthesis of 1 g of dry biomass of hydrogen bacteria under conditions of unlimited growth was found to require (in mg)  $120 \pm 5$  nitrogen,  $17.8 \pm 1.0$  phosphorus,  $5.2 \pm 0.3$  sulfur,  $4.1 \pm 0.2$  potassium, and  $4.3 \pm 0.4$  magnesium. Rats fed a synthetic diet containing hydrogen bacteria weighed substantially more than controls at the end of 6 months and exhibited no significant physiological abnormalities. Figures 4; Tables 5; References 41: 23 Russian, 18 Western.

USSR

UDC 576.8

EFFECT OF OXYGEN ON THE GROWTH OF THE YEASTS CANDIDA LIPOLYTICA AND  
CANDIDA TROPICALIS ON A MEDIUM CONTAINING HEXADECANE

Moscow IZVESTIYA AKAD. NAUK SSSR, SER. BIOL. in Russian No 4, 1977 signed  
to press 28 Jan 75

MATYASHOVA, R. N., Institute of Biochemistry and Physiology of Micro-  
organisms, Academy of Sciences USSR, Pushchino

[Abstract] The effect of oxygen on the growth of *Candida lipolytica* and *C. tropicalis* which oxidize hexadecane was studied under conditions of periodic cultivation of the yeasts. The cultures entered the slow growth phase solely as a result of deficiency of oxygen for which the appropriate rate of aeration of the medium was chosen. The specific growth of the 2 cultures on hexadecane as the carbon source started when the dissolved oxygen decreased to 42-48% of saturation. The oxygen concentration critical for the growth of the cultures was 2 to 2.5 times higher than

that below which the rate of cell respiration began to slow. After the growth of the cultures slowed, it again accelerated when aeration of the medium was intensified. Figures 2; References 4: 3 Russian, 1 Western.

USSR

UDC 632.4:633.367

FUSARIOSES OF FOOD LUPINE UNDER THE CONDITIONS OF THE SOUTHWESTERN ZONE OF THE USSR NONCHERNOZEM BELT, AND MEASURES FOR ITS CONTROL

Kiev MIKROBIOLOGICHNYY ZHURNAL in Ukrainian No 1, Jan/Feb 77 signed to press 30 Jan 76 pp 71-78

KISELEV, I. I., and DUKHANINA, I. O., Novosibkovskiy Agricultural Station of Property and Agricultural Lands

[Abstract] The lupine is one of the most valuable of agricultural crops, as has been known since the 18th century, owing to its high acid and protein content (the latter is some 4-5% higher than that of grains), and also the presence of fat, vitamins and other nitritive elements. However, this crop, as it exists in the southwest non-chernozem belt of the USSR, is the victim of two types of fusarium-based disease--root rot and tracheomycotic wilt. The causative agents are the species *Fusarium oxysporum*, *F. Avenaceum* and *F. Solani*. The rot attacks seedlings, the wilt strikes at the time of formation of buds and seeds. Measures for combating these pests consist in the treatment of seeds (with poisons), strict observance of crop rotation, and the breeding of resistant varieties of lupine. Tables 4.

USSR

UDC 615.33 + 615.31

ANTIMICROBIC EFFECT OF CERTAIN OXAZOLIDINE DERIVATIVES

Kiev MIKROBIOLOGICHNYY ZHURNAL in Ukrainian No 1, Jan-Feb 1977 signed to press 22 Apr 76 pp 108-110

PETRUS, V. V., Uzhgorod Medical Institute

[Abstract] Twenty-one derivatives of oxazolidine were studied for possible antimicrobical action. Eight species of microbes were studied: *Salm. typhimurium*, *Serratia marcescens*, *Ps. aeruginosa*, *E. Koli*, *Bas. pseudo-anthracis*, *Staph. aureus*, *Sh. Flexneri* and *Kl. aerogenes*. The oxazolidine derivatives differ from thiazolidines in having oxygen present in a 5-member ring. Concentrations of the derivatives were generally effective in the 90-3,140 microgram range. Possible applications in the area of disinfection are foreseen. Table 1; References 4 (Russian).

USSR

UDC [615.32+615.31]:576.858.75

ACTION OF CERTAIN THIOPHOSPHAMIDE DERIVATIVES OF ALKALOIDS AND AMINES  
AGAINST THE INFLUENZA VIRUS

Kiev MIKROBIOLOGICHNYY ZHURNAL in Ukrainian No 1, Jan/Feb 77 signed to  
press 2 Feb 76 pp 58-60

LOZYUK, L. V., KOTLYAR, M. M., and SHABLOVS'KA, YE. O., L'vov Scientific-  
Research Institute of Epidemiology and Microbiology

[Abstract] The method of primary selection was used to study certain newly synthesized compounds belonging to the alkaloid ethylenimines, and certain others of this same group which were already known. Both in vitro and in vivo tests revealed certain substances (amitozin, colchaminethioteph, thiotepea) which had a marked action against the Type A influenza virus (H3N2) and the Port Chalmers 1/73 strain. These preparations, in addition, are inhibitors, with slight toxicity. Table 1; References 8: 6 Russian, 2 Western.

USSR

UDC 576.851.49

COLICINOGENICITY AND COLICINE-SENSITIVITY OF SALMONELLA TAKEN IN THE  
TRANSCARPATHIAN REGION

Kiev MIKROBIOLOGICHNYY ZHURNAL in Ukrainian No 1, Jan/Feb 77 signed to  
press 10 Nov 75 pp 44-48

GRYSHCHENKO, R. I., and SAKAL', M. M., Transcarpathian Oblast Sanepid  
Station

[Abstract] Results are given from a study of the colicinogenicity of 575 Salmonella strains and of the colicine-sensitivity of 484 Salmonella strains, during the period 1973-1975. It was shown that 20.8% of the strains were colicinogenic, the most widely distributed being the conditioned colicinotype K-12, φ (70.8% of all colicinogenic cultures). Colicine-sensitivity among salmonella is more rare, appearing in only 13.7% strains. Sensitivity to 13 colicines and their combinations (B, D, E + i, F, H, I, J + i, K, S<sub>1</sub>, S<sub>3</sub> + i, S<sub>4</sub>, S<sub>5</sub> and V) was found. Colicinotypes E, IE and HE occurred more frequently. A prevalence of 66.5% was observed for those Salmonella strains which had no colicinogenic properties, and were resistant to standard colicines. Determination of sensitivity of Salmonella to colicines should be determined with allowance for the phase of dissociation, since S→R-dissociation of cultures is accompanied by broadening of the colicine-sensitivity spectrum. In some cases, a study of colicinogenicity and colicine-sensitivity of Salmonella strains can be useful in determining the epidemiological bonds in salmonellosis foci. Tables 3; References 7 (Russian).

USSR

UDC 576.851.49.01(260-17)

SURVIVAL OF ENTEROPATHOGENIC BACTERIA IN LITORAL SEA WATER

Moscow GIGIYENA I SANITARIYA in Russian No 1977 signed to press 26 May 76  
pp 113-114

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[Abstract] A study was made of the longevity of individual species of enteropathogenic bacteria and the changes in their properties in unfrozen waters from a marine bay and a northern sea. The species considered were Sh. Sonnei, Sh. Flexner and S. Newport. Experiments were run at 4°C, the average yearly temperature for the region and at 16°C, the temperature of the surface water during the summer. The survival rate in the bay water at 4°C was as follows: S. newport, 10 days; Sh. sonnei, 6; Sh. flexner, 6; in the sea water 20.7 and 10 days respectively. At 16°C in the bay water S. newport was observed for 6 days; Sh. sonnei and Sh. flexner, for 3 days; in the sea water, 16, 4 and 3 days respectively. When the water was autoclaved before inoculation, some species survived for as long as 70 days. No significant changes in their biological properties were noted.

Molecular Biology

USSR

UDC 575.24

PARTICIPATION OF THE RESTRICTION SYSTEM "K" IN REPAIR OF INTERSTRAND CROSSLINKS IN DNA

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 235, No 1, Jul/Aug 77  
signed to press 23 Mar 77 pp 208-211

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[Abstract] The restriction-modification (RM) system occupies a special position in *E. coli* cells (Kochkina, et al., 1975). Enzymes of  $R_kM_k$  and  $R_bM_b$  are oligomers composed of 3 different subunits, associated with the functions of recognition, restriction, and modification (methylating activity). A characteristic trait of the RM-complex is its high ATPase activity. The RM system provides the cell its capacity to recognize and destroy foreign DNA (Matthews, 1968; Vaynshteyn, 1967). No data are available as yet on the relation of the RM complex with other cell systems, particularly the system of DNA reparation. In this article the authors describe the participation of the  $R_kM_k$  system in restriction of bacterial DNA and lambda phage DNA. Inactivating agents used were short-wave UV ( $\lambda$  254 nm) and 8-methoxysoralene plus light ( $\lambda > 320$  nm). Strains studied were *E. coli* C600 and C600  $r_k^- m_k^-$  (Mezel'son); 802  $r_k^- m_k^-$  and 803  $r_k^- m_k^-$  (Wood); AB1157 and AB1886  $uvrA^-$  (Howard-Flanders); strain *E. coli* C obtained from R. Sinsheimer; and, also, the authors'-prepared lysogenized strains C600 ( $\lambda$ , 434), C600  $r_k^- m_k^-$  ( $\lambda$ , 434), AB 1886 ( $\lambda$ , 434). The  $\lambda_{11}$  bacteriophage was obtained from R. Devore. UV radiation used a BUV-15 ( $\lambda$  254 nm) lamp and a UFD-4 dosimeter with a magnesium photoelement. The W-reaction of the phage was plotted as a function of the UV dose of the irradiated bacteria. The (RM)<sub>k</sub> apparently participates in reparation of interstrand crosslinks in the phage DNA, as indicated by a clear weakening of W-reactivation and reactivation by the prophage for photosensitized (and 8-MOP-treated) lambda phage on strains  $r_k^- m_k^-$  and  $r_k^- m_k^+$ . The interstrand crosslinks in lambda phage DNA are not repaired if either the system of damage removal or the system of (RM)<sub>h</sub> are disrupted. The (RM)<sub>k</sub> system also participates in repair of interstrand crosslinks in bacterial DNA. The participation of the (RM)<sub>k</sub> system in repair of the crosslinks indicates presence of an association between enzymes belonging to different functional groups, but which are proteins reacting with DNA. Figures 3; Table 1; References 15: 1 Russian, 14 Western.

USSR

UDC 576.8.095:577.21:575.13

MECHANISM OF GENETIC RECOMBINATION IN CONJUGATION OF BACTERIA. REPORT VII.  
HETEROGENICITY OF THE PROGENY OF EXCONJUGANTS

Moscow GENETIKA in Russian Vol 13, No 5, 1977 signed to press 12 Apr 76  
pp 862-871

BRESLER, S. YE., GORYSHIN, I. YU., and LANTSOV, V. A., Leningrad Institute  
of Nuclear Physics imeni B. P. Konstantinov, Academy of Sciences USSR

[Abstract] The authors present evidence to show that heterogeneity of the progeny of recombinant clones is not a function of the method or primary selection of these clones. Hence the basic prediction of a model of autonomous multiplication of fragments of donor DNA as the way to accomplish heterogeneity of the progeny of a merozygote is not valid. Two new characteristics of the latter heterogeneity are described: the first involves construction of the function of distribution of merozygotes, based on the number of fissions of segregated recombinants; this is a symmetrical, exponentially diminishing curve where the maximum of the function falls in the first division after which it drops exponentially, and relaxation time approximately coincides with the third cell division. To describe the exponential decrease in the function, it is necessary to assume that the period of division of the merozygotes is larger than the period of division of the recombinants. The second characteristic reflects the dependence of the magnitude of heterogeneity on the interlinking capacity of selected and unselected markers. Figures 4; Tables 4;  
References 13: 4 Russian, 9 Western.

USSR

UDC 575.24:582.282.23

MUTANTS OF PICHIA GUILLIERMONDII YEAST WITH MULTIPLE SENSITIVITY TO  
ANTIBIOTICS AND ANTIMETABOLITES. REPORT 1. SELECTION AND SOME PROPERTIES  
OF THE MUTANTS

Moscow GENETIKA in Russian Vol 13, No 5, 1977 signed to press 22 Apr 76  
pp 872-879

SIBIRNYY, A. A., SHAVLOVSKIY, G. M., and GOLOSHCHAPOVA, G. V., Institute of  
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[Abstract] The yeasts used were MS1, viz., ATCC 9085, a riboflavin-dependent mutant, adapted to low concentrations of B<sub>2</sub>; prototrophs, selected by the action of UV, from strains MS1 (MS8 and MS14); and, segregants of genotype ade<sub>2</sub> (type of interbreeding of mat<sup>-</sup>), obtained

from hybrid D19 (see Sbornyy, Genetika, No 2, 1977). MS1 requires, for growth, 1000 times less exogenous B<sub>2</sub> than non-adapted mutants. It had an increased sensitivity to the inhibiting action of actinomycin D and L-canavanin. The MS8 and MS14 revertants synthesized riboflavin and displayed multiple sensitivity to actinomycin D, rifamicin, euflavine, mitomycin C, actinomycin A, 8-azaadenine, 8-azaguanine, L-kanavanin, and 7-methyl-8-trifluoromethyl-10-(1'-D-ribityl)-isoalloxazine. These mutants lost their capacity to assimilate glycerine and ethanol as the only source of carbon for growth. Mutants which were isolated from MS14 and could assimilate glycerine were resistant to Actinomycin D. Mutation (or mutations) which define the multiple sensitivity and incapacity to utilize glycerine are received. Figures 7; References 17: 4 Russian, 13 Western.

USSR

UDC 575.1:576.851.5

STUDY OF RIBOFLAVIN OPERON IN BACILLUS SUBTILIS. REPORT XII. DETERMINATION OF CONTENT OF ATP:RIBOFLAVIN-5'-PHOSPHOTRANSFERASE AND RIBOFLAVINSYNTETASE IN CELLS WITH DIFFERENT GENOTYPE

Moscow GENETIKA in Russian Vol 13, No 5, 1977 signed to press 29 Mar 76  
pp 880-887

BRESLER, S. YE., PERUMOV, D. A., GLAZUNOV, YE. A., SHEVCHENKO, T. N., and CHERNIK, T. P., Leningrad Institute of Nuclear Physics imeni B. P. Konstantinov, Academy of Sciences USSR; All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow

[Abstract] This work examined the association of regulation of biosynthesis of riboflavin and flavinmononucleotide (FMN) by parallel measurement--in various strains of Bac. subtilis--of the activity of the two subject enzymes. Bac. subtilis strains used were SH giv--prototroph; lum 13, 1ch 17--mutants of the SH giv strain resistant to lumiflavin or lumichrome; rib C 1, rib 0 355--regulator- and operator-constitutive strains capable of high synthesis of riboflavin; double mutants lum 13-rib C 1, lum 13-rib 0 355, 1ch 17-rib C 1, 1ch 17-rib 0 355, i.e., resistant to lumiflavin or lumichrome variants of constitutive strains; rib D 107--a mutant auxotrophic for riboflavin, having a genetic block at the stage of formation of 5-amino-4-riboxylaminouracil with a wild-type regulator mechanism; and, also, its variants lum-rib D 107, 1ch 17-rib D 107. Strains of Bac. subtilis resistant to lumiflavin or lumichrome, which simultaneously accumulate riboflavin, FMN, and flavinadeninedinucleotide, display an increased level of riboflavin kinase. Regulation of synthesis of the latter and of riboflavin synthetase proceeds in an uncoordinated manner, despite the fact that the regulating protein is universal for all flavinogenesis, and is due to the presence of two operators. With increase in concentration of

riboflavin in the medium to 10 mcg/ml, growth in synthesis of FMN is seen; here, up to 15% of exogenous riboflavin is transformed into FMN. Regulation of the biosynthesis appears to be due to the existence of many operators which control flavinogenesis in *Bac. subtilis*. The authors suggest need for research to determine whether the synthesis of riboflavin kinase and FMN-adenylic transferase (enzymes which synthesize flavinadenine dinucleotide) is regulated by the same operator or whether each of the corresponding genes has its own operator. Figures 3; Table 1; References 13: 8 Russian, 5 Western.

USSR

UDC 575.24:576.851.5

STUDY OF ONTOGENETIC SWITCHING OVER IN *BACILLUS SUBTILIS*. REPORT I.  
CHARACTERISTICS OF MUTANTS CONDITIONALLY RESISTANT TO CATABOLIC REPRESSION

Moscow GENETIKA in Russian Vol 13, No 5, 1977 signed to press 9 Mar 76  
pp 897-904

RUBIKAS, I. P., SASNAUSKAS, K. V., and IOMANTIS, YU. V., Institute of Biochemistry, Academy of Sciences LithSSR, Vil'nyus

[Abstract] Catabolic repression is the change in growth of *Bac. subtilis* in a medium which has been enriched with 2% glucose and 1% enzyme hydrolysate of casein. In growth of *Bac. subtilis* WB746 (the initial strain, obtained from the US) on milk agar, zones of clarification of the medium form around the colonies due to hydrolysis of casein by extra-cellular proteolytic enzymes. When the medium is enriched by glucose (up to 1%) and aminoacids to 0.02%, the zones of casein hydrolysis do not form since the synthesis by the extra-cellular proteases is repressed. Hence the criterion of selection of mutants, resistant to catabolic repression, is the trait of formation of the hydrolysis zone. Evaluation and characterization of 92 mutants, obtained after treatment of the spores with nitro-soguanidine was carried out by incubation in a liquid synthetic sporulating medium with the 2% glucose and 1% enzyme hydrolysate of casein. Behavior of the mutants was compared with that of the initial strain in this medium. Samples were taken after 6 and 24 hours, and the mutants were divided into three groups. Typical characteristics of each group are presented. For group I after 6 hrs, the pH is 5.25; serine protease activity 0.3 (units/ml); metal protease 1.0; alpha-amylase 0.6. For group I after 24 hrs, the values changed but little; alkaline phosphatase activity was 0.5, and the culture died. For group II, pH is 5.5 (at 6 hrs), 7.5 (at 24 hrs); serine protease activity 0.5 (6 hr), 17.0 (at 24 hrs); metal protease 2.0 (at 6), 40.0 (at 24); alpha-amylase 0.6 (at 6), 7.0 (at 24); alkaline phosphatase 7.0 (at 24 hrs). For Group III, pH is 6.2 (6 hr), 7.7 (24 hr); serine protease 15

(at 6), 170 (at 24); metal protease 22 (at 6), 60 (at 24); alpha-amylase 3.0 (at 6) and 30 (at 24); alkaline phosphatase 8.0 (at 24 hrs). The differences in mutant growth occurred under the conditions of catabolic repression, but were not seen in growth on a synthetic sporulating medium. The described mutants can be used to study the action of genes during ontogenetic switching over, and, also to study mechanisms of catabolic repression in *Bac. subtilis*. Figure 1; Table 1; References 18: 3 Russian, 15 Western.

USSR

UDC 547.963.3

ISOLATION OF FRAGMENTS OF NATIVE DNA CONTAINING STRUCTURAL GENES AT THE END

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 232, No 3, Jan 77 signed to press 22 Apr 76 pp 706-709

RYSKOV, A. P., YENIKOLOPOV, G. N., VYGODINA, T. V., DOBBERT, N. N., and GEORGIYEV, G. P., corresponding member, Academy of Sciences USSR. Institute of Molecular Biology, Academy of Sciences USSR, Moscow

[Abstract] The present article suggests an essentially new approach to obtain fragments of native DNA of arbitrary size which contain structural genes at the end. Schematically, the method involves: i) preparation of fragments of DNA of a definite size; ii) segregation, from these fragments, of small sections of 3<sup>1</sup>-terminal chains with the use of exonuclease III of *E. coli*; iii) hybridization of poly A<sup>+</sup>mRNA with single-chain sections of these fragments; and, iv) separation of the hybridized fragments of DNA on poly  $\mu$ -sepharose; DNA cells of Ehrlich's mouse ascites carcinoma labelled with tritium-thymidine were used. It is possible to isolate, with adequate specificity, from total DNA, long native fragments which contain at the end single-chain sections corresponding to structural genes. These DNA fragments can be used to obtain recombinant molecules and subsequent cloning and, in addition, to study the sequences belonging to a structural gene. Figures 4; Table 1; References 10: 1 Russian, 9 Western.

USSR

UDC 575.24+576.851.5

UV-RADIATION INDUCTION OF ANTIMUTAGENIC ACTIVITY IN BACILLUS SUBTILIS CELLS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 232, No 3, Jan 77 signed to press 18 Oct 76 pp 683-686

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[Abstract] The mechanism of UV-induced mutagenesis in bacteria is obscure. It has been hypothesized (Witkin, 1974) that *E. coli* produces an enzyme (mutagenic function), synthesized *de novo* in the irradiated cells, which participates in post-replicative reparation of DNA. The constitutive-enzyme system of the excision reparation, according to the hypothesis, removes the photoproducts from the cellular DNA without formation of mutations, i.e., it is an antimutagenic factor; in repression of synthesis of the mutagenic function, for example, the excision reparation, due to hunger of the irradiation bacteria for a nitrogen source, removes the majority of the pre-mutation injuries, working an irreversible decrease in frequency of mutation. The authors tested the pertinence of this hypothesis in *Bac. subtilis* (they used strain *Bac. subtilis* 1208 leu8 met 5, auxotrophic for leucine and methionine). They were unable to confirm the hypothesis of the existence of an induced mutagenic function in the bacteria. Their data suggested that the low frequency of UV-induced mutations under conditions of inhibition of post-radiation synthesis of macromolecules is not the result of an absence of mutagenic function, but is caused by the appearance of antimutagenic activity as a correct excision reparation of a quiescent chromosome. It is possible that the enzyme system has the role of a mutagenic function when transcription loci are repaired under conditions of active post-radiation growth. Figures 3; References 10: 3 Russian, 7 Western.

USSR

UDC 575.1.113+576.-858.9

CONSTRUCTION OF RECOMBINANT MOLECULES OF DNA IN VITRO AND CLONING WITH THE USE OF THE ECORI\* ACTIVITY OF RESTRICTION ENDONUCLEASE OF ECORI

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 232, No 3, Jan 77 signed to press 8 Oct 76 pp 687-690

MEL'NIKOV, A. A., KUZ'MIN, N. P., KOPYLOVA-SVIRIDOVA, T. N., and BAYEV, A. A., academician, Institute of Biochemistry and Physiology of Microorganisms, Academy of Sciences USSR, Pushchino, Moskovskaya Oblast

[Abstract] Substrate specificity of EcoRI restriction endonuclease *in vitro* is known to depend on the ionic strength of the solution and pH of the

medium. The changed enzymatic activity of EcoRI, as a consequence of alteration of the ionic strength and pH, is termed EcoRI\*. The change in the enzyme action affects the number of accessible cleavage points in the substrate molecule. Use of this changed activity for preparation of recombinant molecules of DNA in vitro and for cloning of DNA fragments was studied in the present article. Materials used included one of the EcoRI fragments of DNA phage T5 sto, molecular weight 13.5 megadaltons; this carries the genes of transport RNA of phage T5, consisting of the fifth part of the EcoRI fragment. To obtain this section with the genes, the authors used EcoRI\* conditions for cleavage. The authors also used DNA of phage  $\lambda$ gt- $\lambda$ C (obtained from the Institute of Molecular Biology, AS, USSR). The EcoRI restrictase was produced from cells of *E. coli* strain HB1100 and purified by column adsorption. Fragments of DNA of phage  $\lambda$ gt- $\lambda$ C were produced by cleavage with EcoRI restrictase. An EcoRI fragment of DNA of phage 75 sto (m.w.=13.5) was isolated analogously and then, to obtain a collection of different fragments, it was split under EcoRI\* conditions. This reaction was carried out for 5, 15, and 45 min. To each collection of EcoRI\*-produced fragments was added the end fragments of the DNK of phage  $\lambda$ gt- $\lambda$ C in a ratio of 2:5 (by weight). The infectious activity of the recombinants was then determined against an *E. coli* strain; the recombinant DNA was obtained from phages isolated from separate negative colonies and cultivated. The recombinants were split under EcoRI conditions, and also with restriction endonuclease Sma (P. Belyaeva, from *S. marcescens* SB). The split fragments were separated by slab-electrophoresis. Radiation measurements were also made of hybrids of recombinant DNA with a tritium-labelled phage. The electrophorogram and radioactivity readings indicate that the conditions of EcoRI\* activity of restriction endonuclease can be used to produce recombinant DNA in vitro. Figures 4; Table 1; References 11: 2 Russian, 9 Western.

USSR

UDC 577.15+547.963

INVERSE TRANSCRIPTION OF A FRAGMENT OF RNA WHICH HAS A SECONDARY STRUCTURE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 232, No 3, Jan 77 signed to press 30 Sep 76 pp 710-713

FROLOVA, L. YU., BERZIN', V. M., YANSONE, I. V., GREN, E. YA., METELEV, V. G., SMIRNOV, V. D., SHABAROVA, Z. A., and KISELEV, L. I., Institute of Molecular Biology, Academy of Sciences USSR, Moscow; Institute of Organic Synthesis, AS Latvian SSR; Moscow State University imeni M. V. Lomonosov

[Abstract] DNA prepared by inverse transcription catalyzed by the enzyme of RNA-controlled DNA-polymerase (revertase) is ever more widely used in research in molecular biology and genetics and as a starting material by

genetic engineers (see Frolova, 1976, a review). The present paper attempts to establish whether--in a system with known, primary, structural, polyribonucleotidyl matrix and primer--complete inverse transcription of the fragments of RNA with a stable, secondary structure takes place. The revertase, from purified virus of avian myeloblastosis was supplied by Prof. J. Bird; synthesis of the octadesoxyribonucleotide-primer, and isolation of the RNA MS2 were described in earlier reports. Synthesis of polydesoxyribonucleotide (PDR) was found to depend on addition of the primer. It was earlier shown that synthesis of PDRs does not occur in the absence of a matrix. The reaction is inhibited by actinomycin D which evidently inhibits synthesis of a second strand of DNA, complementary to the first. The synthesis product does not contain high-molecular polynucleotides which indicates absence of the slippage of the matrix seen in synthetic homopolymers. With complete copying of the RNA fragment, the length of the product should be equal to 52 nucleotides, including primer length; actual and theoretical values agree. The authors suggest that enzyme synthesis of PDR chains based on a short matrix with a known primary structure opens additional possibilities for use of the phenomenon of inverse transcription: with the help of fragments of RNA, isolated from natural specimens or synthesized in vitro, fragments of DNA can be prepared with a desired structure and be cultivated by the methods of genetic engineers for ultimate use in various directions. The present research is a part of the "Revertase" project. Figures 3; References 15: 4 Russian, 11 Western.

USSR

UDC 576.851.513.083.23

ACCOMPLISHMENT OF TRANSFORMATION OF BACILLUS SUBTILIS IN THE BODY OF MICE  
UNDER CONDITIONS OF IMMUNOLOGICAL INHIBITION OF THE ACTIVITY OF EXOGENASE  
DNAase 1

Moscow BYULLETEM' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 84,  
No 7, Jul 77 signed to press 3 Dec 76 pp 68-70

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[Abstract] The authors suggest a new model which succeeded in transformation of *B. subtilis* in the chest cavity of mice. The transformation method used was based on that of Spizizen (1958). Donor strain, the source of the transforming DNA, was the prototrophic *B. subtilis* W2BEMB. Recipient strain was the auxotrophic *B. subtilis* 168-2 (*trp*<sup>-</sup>, *leu*<sup>-</sup>). Transforming DNA was isolated by the Bresler method (Biokhimiya No 5, 1963, p 907). Immune anti-DNAase sera was prepared by full immunization of rabbits, for

3 weeks. The DNAase was administered (with Freund's adjuvant) subcutaneously; gamma globulin was isolated from the immune and control sera. Immune and non-immune gamma globulin was administered (0.5 ml) intrathoracically to DBA/2 mice (20 g). After 60 min, the transforming mixture, consisting of the recipient strain and the transforming DNA, was administered (i.v.). After 90 min, samples of the thoracic liquid were taken and sown on corresponding media. The frequency of transformation was substantially lowered by administration (i.v.), of bovine DNAase 1. Immune rabbit gamma globulin, which contained antibodies to bovine DNAase 1, inhibited the activity of the DNAase 1 thereby protecting the transforming DNA from the hydrolysing action of that enzyme. The authors feel that their technique can protect administered DNA, in the animal body, in genetic engineering experiments. Figure 1; Table 1; References 15: 6 Russian, 9 Western.

USSR

UDC 576.851.48.095.57.095.18

TEST STRAINS OF E. COLI FOR DETECTION OF CHEMICAL MUTAGENS

Moscow BYULLENTEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 84, No 7, Jul 77 signed to press 28 Jan 77 pp 104-106

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[Abstract] The authors point to the need to identify mutagenic activity in the large number of newly synthesized compounds being used in medicine and biology, in view of the fact that many have already been shown to induce mutations. They have sought a simple bacterial test-system which can identify mutagenic activity of compounds which induce mutations of the type of nitrogen-base interchange in DNA and of the type of "frame-shift." They used E. coli strain AB2500 (thr<sup>-</sup> leu<sup>-</sup> pro<sup>-</sup> his<sup>-</sup> arg<sup>-</sup> thi<sup>-</sup> str<sup>r</sup> drm<sup>r</sup> tsx<sup>r</sup> sup<sup>r</sup> 37 uvr A<sup>-</sup> thy<sup>-</sup>) derived from strain AB1157, and two temperature-sensitive (ts) mutants, API6 and API8, by treatment of the AB2500 with two mutagens acridine orange and 5-bromouracil. These mutants formed revertants when treated with N-methyl-N-nitrosoguanidine, hydroxylamine, nitrous acid, sodium metabisulfite, methylmethanesulfonate, and proflavin. Nitrosoguanidine treatment of strains API6 and API8 yielded mutants API6-3 and API8-10 which were sensitive to crystal violet; the strains were slightly more capable of forming revertants under the effect of proflavin and methylmethanesulfonate. Figure 1; References 7 Western .

USSR

UDC 576.858.098.31.095.18:547.426.1

TRANSFORMATION OF SUBSTRATE SPECIFICITY OF RESTRICTASE ECORI UNDER THE ACTION OF GLYCERINE

Moscow BYULLEHEN ' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 84, No 7, Jul 77 signed to press 24 Dec 76 pp 46-48

KARAMOV, E. V., NARODITSKIY, B. S., ZAVIZION, B. A., and TIKHONENKO, T. I., Institute of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR, Moscow

[Abstract] Restrictases (a restriction endonuclease, type II) are widely used in study of genome structure because the enzymes are highly specific and can hydrolyze palindromic nucleotide sequences of DNA. The authors have searched for stable and reproducible conditions for modification of the activity of the EcoRI restrictase, particularly to obtain reproducible results in the cleavage and analysis of high molecular weight DNA. When glycerine is added, to more than 20%, to a cleavage reaction mixture there is a sharp increase in the number of DNA fragments formed, but more stable hydrolysis results are obtained in the presence of 50% glycerine. Hydrolysis in 50% glycerine practically corresponds to the so-called EcoRI conditions both in molecular-weight distribution of the forming fragments, and also with respect to their quantity. The EcoRI-type of restriction had been achieved with decrease in ionic strength and increase in solution pH, conditions which inactivate the enzyme. The authors' use of glycerine to obtain EcoRI-activity yields reproducible results in the cleavage production of small fragments of DNA and represent a useful adaptation technique for the restriction endonuclease. Table 1; References 8: 1 Russian, 7 Western.

USSR

UDC 612.822.3

EFFECT OF SENSORY STIMULATION ON SOME CHARACTERISTICS OF THE RECRUITMENT RESPONSE

Moscow ZHURNAL VYSSHEY NERVNOY DEYATEL'NOSTI in Russian Vol 27, No 3, May/Jun 77 signed to press 12 May 76 pp 644-647

BURIKOV, A. A., and SHOVKUN, Scientific Research Institute of Neurocybernetics, Rostov-on-Don

[Abstract] The interference of a specific activity and of activity of the thalamo-cortical non-specific system is a major aspect of study of the regulatory activity of the central nervous system. Research has shown a definite dependence, of the character of evoked responses, on the phases of the recruitment reaction. It has also been shown that preliminary sensory stimulation temporarily blocks the mechanism of appearance of a spindle, or alters the type of the reaction, converting it from a response with a periodic manifestation of spindles (oscillatory type) into a response with spindles only at the beginning of the stimulation (oscillatory-attenuating type), and, even, into a reaction with equi-amplitude responses (aperiodic type). The authors have examined the influence of sensory stimulation on the amplitude and temporal characteristics of a steady recruitment reaction; chronically-trained rabbits were used as the experimental animals. The recruitment reaction was evoked by low-frequency stimulation of the central medial nucleus of the thalamus and recorded from the surface of the somatosensory area of the cortex. Sensory signals applied were sound, and electrocutaneous, and, also, tactile stimulation of the anterior contralateral lobe; some high-frequency stimuli were tried on the reticular formation of the midbrain. Sensory stimulation was found to substantially affect the character of the recruitment response; the effect reflected the nature of the recruitment response as an auto-oscillatory process in the thalamo-cortical non-specific system. The spindle of the reaction, manifested as a unique discharge, cannot be interrupted even with strong sensory stimulation, only the amplitude of the responses is decreased, and this amplitude is immediately restored in case of a short stimulus. The sensory activation does not affect the amplitude of responses in the interval between the spindles. A different phase of the recruitment reaction is sharply manifested under the influence of the sensory stimulus at the moment of appearance of the subsequent spindle: stimulation at the spindle leads to earlier appearance of the spindle, that is, it evokes a negative shift in the phase of oscillation; stimulation in the interval between spindles evokes a later spindle, that is, a positive shift. The recruitment response is not a quantitative change of some frequency, neurophysiological, process but a complex change in the status of the thalamo-cortical system. Figures 2; References 8: 5 Russian, 3 Western.

USSR

UDC 616.45-001.1/.3-092.9-07:616.831.41-073.97

## ELECTRICAL ACTIVITY OF THE HYPOTHALAMUS DURING STRESS

Moscow BYULLETEL' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 84, No 7, Jul 77 signed to press 25 Jan 77 pp 3-5

FILARETOV, A. A., and VASILEVSKAYA, L. V., Institute of Physiology imeni I. P. Pavlov,

[Abstract] The hypothalamus plays an important role in stress activation of the hypophyseal-adrenocortex system and injury to the hypothalamus, or to afferent impulses to it, disturbs the response of the system to stress. The authors have collected some data on the electrical activity of the anterior, medial, and lateral hypothalamus during stress in rabbits induced by immobilization. The immobilization led to activation of the hypophyseal-adrenocortex system manifested by an increase in content of blood corticosteroids; this increase appeared even 5 min after stress application and became larger over the next 55 min of the experiment. Frequency of discharges in the neuron pools of the three sectors of the hypothalamus also changed under the stress: activation of the medial sector accompanied the stress, whereas inhibition of the anterior and lateral hypothalamus was found. The activation, and inhibition, reflect the central interrelations of the hypothalamus during stress, and confirm earlier (1976) work of Filaretov. Figures 3; Table 1; References 10: 3 Russian, 7 Western (one by Filaretov).

USSR

UDC 616.832-009.7-089.5:615.844.032.815

## ANALGESIA UNDER ELECTRICAL STIMULATION OF NUCLEI OF THE MIDBRAIN IN RATS WITH A PAIN SYNDROME OF SPINAL ORIGIN

Moscow BYULLETEL' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 84, No 7, Jul 77 signed to press 14 Feb 77 pp 16-19

IGON'KINA, S. I., and KRYZHANOVSKIY, G. N., corresponding member of the Academy of Medical Sciences USSR, Institute of General Pathology and Pathological Physiology, AMS USSR

[Abstract] Analgesia is known to be induced by electrical stimulation of certain areas of the brain, particularly the periventricular gray substance and dorsal nucleus of the midbrain raphe. The authors have examined the effect of electrical stimulation of the nuclei of the raphe and peri-water-conducting gray substance of the midbrain, on the title experimental pain. This latter pain was produced by placing a generator of pathologically

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intensified stimulation on the dorsal horns of the spinal cord; a comparison was made of the influence of electrical stimulation of the same brain structures on physiological pain evoked by nociceptive irritations. The electrical stimulation lowered both the pathological and the physiological pain. The authors speculate that the electrical stimulation involves an increase of descending inhibition in the spinal cord and, also, a blocking of excitation at the supraspinal level. Such a mechanism should participate, under natural conditions, in achieving the analgesic effect during pain syndromes of central origin. Figure 1; References 20: 9 Russian, 11 Western (one by Kryzhanovskiy).

Pharmacology

USSR

UDC 576.8

USE OF THE TISSUE CULTURE METHOD TO DETERMINE THE TOXICITY OF FIBRINOLYTIC PREPARATIONS

Moscow IZVESTIYA AKAD. NAUK SSSR, SER. BIOL. in Russian No 4, 1977 signed to press 12 Nov 76 pp 602-605

IMSHENETSKIY, A. A., KASATKINA, I. D., SOLNTSEVA, L. I., ZHELTOVA, YE. T., and AFANAS'YEVA, L. N., Institute of Microbiology, Academy of Sciences USSR, Moscow

[Abstract] The toxicity of 3 fibrinolytic preparations of different origins - terrilytin (derived from the mold fungus *Aspergillus terricola*), fibrinolysin (isolated from human blood plasma), and the Swedish enzyme preparation of the Astra firm (derived from the mold fungus *Aspergillus oryzae*) - was quickly determined in cultures of fibroblasts (L. strain). After 20 hours' incubation at 37°; fibroblasts in control test tubes (without addition of an enzyme) formed a monolayer on the glass consisting of a large number of flattened cells with processes and spindle-shaped cells possessing the typical morphology of fibroblasts. In the tests with the 3 enzymes, however, all the fibrinolytic preparations in high concentrations suppressed the reproduction of the fibroblasts and prevented the formation of a monolayer. The Astra product proved to be the most toxic, the minimum suppressant concentration being 0.025 mg/ml. Figure 1; Table 1; References 11: 7 Russian, 4 Western.

USSR

UDC 614.484

DISINFECTANT PROPERTIES OF ANTISEPTIC DETERGENT VEGA UNDER CONDITIONS OF DRUG PRODUCTION

Kiev MIKROBIOLOGICHNYY ZHURNAL in Ukrainian Vol 39, No 3, 1977 signed to press 3 Jun 76 pp 359-352

VASILEVSKAYA, I. A., SERGEYCHUK, M. G., FASTOVSKAYA, A. YA., CHERNYASKAYA, L. M., NIKITENKO, A. G., VERESHCHAGINA, S. O. and LESMAN, N. Y., Kiev State University; Darnitsa Chemico-Pharmaceutical Plant

[Abstract] The new synthetic detergent "Vega" containing nonionic surface active compounds and quaternary ammonium salt of alkylbenzyldimethyl-ammonium chloride (catamin) was tested for the disinfection of hands of workers involved in the production of drugs. From 80 to 100% of bacteria were destroyed on hands washed with this detergent for 1-2 min., as opposed to only 18-60% in the case of ordinary soap. The detergent solution (1:50, 1:100) was especially effective against *Staphylococcus*

*aureus*, *Bacillus cereus* and *Penicillium chrysogenum*, and less effective against *Escherichia coli* and *Candida albicans*. The detergent Vega comes as a paste and is recommended for pharmaceutical workers to replace ordinary soap for washing of hands. Figures 1; Tables 4; References 4 (Western).

USSR

UDC 632.954.2-074

#### TOXICOLOGICAL CHARACTERISTICS OF THE HERBICIDE ZEAZIN

Kiev VRACHEBNOYE DELO in Russian No 5, May 77 pp 133-136

GZHEGOTSKIY, M. I., professor, SHKLYARUK, L. V., and DYCHOK, L. A., Lvov Medical Institute

[Abstract] To determine these characteristics of zeazin (active substance content of 50% 2 chloro-4-isopropylamino-6-ethylaminoriazene) tests were carried out on 225 white rats. The absolute lethal dose was 3,000 mg/kg and in interabdominal injections 280 mg/kg. The average lethal dose (50% fatalities) was 1,400 mg/kg, and for interabdominal injections 125 mg/kg. The minimal lethal dose was 550 mg/kg. Rapid breathing was noticed 20-50 minutes after injection, and difficult and infrequent respiration 40-50 minutes after injection. All animals died within 12-24 hours. It is dangerous to fish, a 100% death rate resulted from 50 mg/l within 24 hours. An application of 10 mg/l caused a 100% fish loss after 16-20 days, while no losses were noted over a three months period following a 0.5 mg/l application. Although in general it has a low toxicity for warm blooded animals, if ingested it can seriously and fatally disturb the functioning of the central nervous system, the liver, and cause changes in the blood composition. References 0.

USSR

UDC 615.214.22:547.891.2].033

#### DISTRIBUTION OF NITRAZEPAM AND ITS METABOLITES IN THE SUBCELLULAR FRACTIONS OF CERTAIN ORGANS OF THE WHITE RAT

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian No 1, 1977 signed to press 26 Jan 76 pp 92-96

BOGATSKIY, A. V., GOLOVENKO, N. YA., and KARASEVA, T. L., Laboratory of Psychotronic Preparations, Odessa University imeni I. I. Mechnikov

[Abstract] At the present time, no study has been made of the subcellular distribution of nitrazepam, despite the extensive clinical use of this

tranquilizer, and the successes realized in investigations of its metabolism and pharmacokinetics. The authors undertook to study such distribution of both nitrazepam and its metabolites, using nitrazepam synthesized in their own laboratory, with white rats as experimental animals. The nitrazepam was administered intra-abdominally, in doses of 100 mg/kg. Enzymatic reduction was observed, followed by acetylation. Metabolites were found in cell fragments, nuclei and the mitochondrial, microsomal and soluble fractions of four selected organs (liver, lungs, heart and cerebrum). It was found that reduction of the substrate is present in the soluble and microsomal liver fractions; acetylation, in the liver mitochondria and lungs. The metabolites (mogadone, eunoktine) were fairly evenly distributed in the cell organelles of heart and cerebrum, and this would indicate their migration to those organs for other organs and tissues where reduction and acetylation are possible. Both the primary substance and its metabolites readily penetrate brain tissue, this accounting for their pharmacological value. Exact figures are given for the content of nitrazepam and its metabolites in the four organs referred to, at the time of maximal action (15 minutes following administration). Table 1; References 18: 7 Russian, 1 Western.

USSR

UDC 616.981.551-092.9-07:616-008.94:577.175.823/.824

ALTERATION OF HISTAMINE AND SEROTIN METABOLISM IN EXPERIMENTAL TETANUS

Moscow VOPROSY MEDITSINSKOY KHIMII in Russian No 1, 1977 signed to press  
2 Dec 75 pp 33-39

CHESNOKOVA, N. P., Department of Pathological Physiology, Saratov Medical Institute

[Abstract] Tests run on guinea pigs and cats showed disruption of histamine and serotonin metabolism as they developed during the course of tetanus intoxication; these disruptions were revealed by a steady rise in the histamine level of many organs against a background of histaminase activity, and by a universal accumulation of serotonin at the early stage of intoxication, with subsequent lowering of its level during the stage of severe generalized tetanus. Along with this was noted a lowered level of lactic and pyroracemic acids in a number of tissues; also a reduction in the number of potassium ions in those tissues. Some 16 organs were tested in connection with these criteria, from three groups of animals (control, early stage, late stage). Complete tabulated data are given. It is concluded that the observed disruptions of amine metabolism during tetanus intoxication are usually accompanied by disruptions of carbon metabolism and electrolytic balance, are of complex origin, and are not exclusively associated with the action of the hypoxic factor. Tables 7; References 15: 7 Russian, 8 Western.

Physiology

USSR

FUNCTIONAL STATUS OF HYPOTHALAMO-LIMBIC FORMATIONS OF THE BRAIN UNDER THE INFLUENCE OF INTERMEDIN

Kishinev IZVESTIYA AKADEMII NAUK MOLDAVSKOY SSR in Russian No 3, 1977  
pp 47-52

MEL'NIK, B. YE., and KRIVAYA, A. P.

[Abstract] The authors note that the mechanism of feedback between the endocrine glands and the central nervous system has not been clarified; the action of intermedin on the hypothalamo-limbic formation of the brain has not been studied at all, and only indirect references in the literature indicate that intermedin alters the EEG in man, through its action on the limbic structures. The present reports examines the latter effect of intermedin on eight formations in sexually mature male rabbits: nucl. supra-opticus; nucl. ventralis lateralis; mammillaris medialis; area amygdalaris anterior; nucl. centralis amygdalae; nucl. basalis amygdalae; hippocampus; and nucl. paraventricularis. The bioelectric activities of these separate nuclei are affected dissimilarly by intravenous administration of intermedin. The changes produced reflect in a definite manner the effect of intermedin on the functional status of the examined nuclei of the hypothalamus, and the results are direct testimony of involvement in the action of several nuclei of the hypothalamus after administration of the intermedin; this testimony is supported by the data of many authors on the hypothalamic regulation of secretion of intermedin. Most sensitive to the action of intermedin were the basal nuclei of the amygdala. The authors feel that their observations of the changes in bioelectric activity, particularly the action of the hypothalamo-amygda-line- and hypothalamo-hippocampus-systems is more direct evidence of the influence of intermedin on behavior and emotional motivation in animals and man. Figures 4; References 17: 8 Russian, 9 Western.

USSR

UDC 612.826+612.822.3

SUMMARY ELECTRICAL REACTION OF THE SUPERIOR OLIVARY COMPLEX TO AMPLITUDE MODULATED SIGNALS

Leningrad FIZIOLOGICHESKIY ZHURNAL SSSR in Russian Vol 63, No 5, May 77  
signed to press 15 Sep 76 pp 626-631

ANDREYEVA, N. G., and TA TUN LAN, Department of Physiology of Higher Nervous Activity, State University imeni A. A. Zhdanov, Leningrad

[Abstract] A study was made of the evoked potentials of auditory centers of 10 large horseshoe bats to AM signals. Experimental conditions have

already been described (this journal, Vol 63, 1977, p 496, by these authors). A synchronization reaction was observed in the cochlear nuclei--with respect to the rapid component of the response--and in the superior olfactory complex--with respect to the rapid and slow component of the response--in the range of frequencies of modulation from 50 to 2000 Hz. Responses of the inferior colliculi were synchronized at frequencies of modulation less than 150 Hz. A similar response was not found in the internal geniculate bodies. Synchronization of the summary responses of the superior olfactory nucleus depend essentially on the frequency of filling of the stimuli. The largest amplitude of responses was recorded, as a rule, in the range of frequencies of modulation of 300-600 Hz. The amplitude of synchronized response appeared to be a function of the frequency and coefficient of modulation and also of the angle of presentation of the stimuli. The existence of a pronounced maximum of amplitude of the summary response with a definite spatial location of the source of the ultrasound indicates that a sector of the neurons is more sensitive with this direction of presentation of the stimuli. Figures 5; References 4: 2 Russian, 2 Western.

USSR

UDC 612.172.014.46:615.357.452)-06:612.275.1.017.2

CONTRACTILE FUNCTION OF THE HEART AND ITS REACTIVITY TO NORADRENALINE IN THE PROCESS OF ADAPTATION OF THE BODY TO MEDIUM HIGH PLACES

Moscow BYULLESEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian Vol 84, No 7, Jul 77 signed to press 13 Dec 76 pp 5-7

NOVIKOVA, N. A., GORINA, M. S., and KAPEL'KO, V. I., Institute of General Pathology and Pathophysiology, Academy of Medical Sciences USSR, Moscow

[Abstract] Adaptation to barochamber hypoxia can increase cardiac muscle contractility; adaptation to 3000 M conditions in the mountains can produce similar responses. Hence, the authors have examined the effects in male Wistar rats of adaptation--for up to one month--to relatively high altitudes. This was about 2100 M at the Medico-Biological Station of the Academy of Sciences, Ukr SSR, at Terskol, in the Elbrus area. Control studies were done on animals housed in Moscow. In the early stages of the stay at 2100 M, the systolic pressure in the left ventricle, and rates of its development and fall significantly exceeded the respective control readings. Subsequent values for the contractile function gradually stabilized. After 4 weeks the hearts of the adapted rats were distinguished by a substantially greater rise in the contractile function in response to noradrenaline administration and by a greater stability of this function with a very high heartbeat rate. Figure 1; Table 1; References 10 (Russian).

USSR

UDC 612.57:577.158

PEROXIDATION OF LIPIDS IN THE BRAINS OF WARM-BLOODED ANIMALS EXPOSED TO  
ACUTE PHYSICAL OVERHEATING

Moscow IZVESTIYA AKAD. NAUK SSSR, SER. BIOL. in Russian No 4, 1977 pp 628-632

SHEPELEV, A. P., Rostov State Medical Institute

[Abstract] Steady elevation of the body temperature of dogs and rats to 44-45° caused a progressive increase in the content of diene conjugates and lipid hydroperoxides and simultaneously a sharp decrease in the antioxidant activity of the lipids and a shortening of the period of induction of malonic dialdehyde. The relative share of polyenic acids (arachidonic and decosanoic) decreased in the composition of the fatty acids. The changes were most pronounced in the hypothalamus, probably because the main centers of thermoregulation are located in this region. Figure 1; Table 1; References 16: 12 Russian, 4 Western.

Plant Biochemistry

USSR

MICROSOMAL HYDROXYLATION OF 2,4-D IN PLANTS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 233, No 6, Apr 77 signed to press 15 Jan 77 pp 1222-1225

MAKEYEV, A. M., MAKOVEYCHUK, A. YU., and CHKANIKOV, D. I., All-Union Scientific Research Institute of Phytopathology, Bol'shiye Vyazemy, Moskovskaya Oblast

[Abstract] Hydroxylation of 2,4-D is an effective detoxifying metabolic process in plants to remove herbicide phytotoxicity. The authors have examined potential hydroxylation of 2,4-D with participation of oxidase systems located in microsomes of plants (cucumbers and peas). Microsome preparations were isolated from two-week old leaves of the plants and their hydroxylase activity (HA) determined. The predominant site of HA is in the microsomal fraction of the leaves; an insignificant HA, found in the mitochondrial fraction, is apparently due to contamination of it with microsomes. Hydroxylation of 2,4-D occurs only in the presence of reduced HADP; maximum yield of hydroxylated product is obtained with combined use of HADP-H and 2-mercaptoethanol (the latter apparently stabilizes the microsome membrane). Hydroxylation of 2,4-D by the microsome membrane occurs only in the presence of molecular oxygen. Under certain situations the capacity of plant microsomes to hydroxylate aromatic compounds can be increased, e.g., when cucumbers and peas are preliminarily sprinkled with a solution of 2,4-D. The results of these studies indicate that HADP-H-dependent microsomal oxygenases of plants can participate in hydroxylation and detoxification. Tables 3; References 7: 2 Russian, 5 Western.

USSR

UDC 575.24:633.1

COMPARATIVE CYTOGENETIC STUDY OF TRITICALES PRODUCED BY A BIOLOGICAL METHOD, TREATMENT WITH COLCHICINE, AND CROSSED AT A DIFFERENT CHROMOSOME LEVEL

Moscow GENETIKA in Russian Vol 13, No 5, 1977 signed to press 11 Mar 76 pp 765-775

FEDOROVA, T. N., and POLENOVA, I. N., Scientific Research Institute of Agriculture of the Central Rayons of the Non-chernozem Zone, Moskovskaya Oblast

[Abstract] At present, three methods of practical selection of triticales are agronomically profitable: the classical method of doubling the number of chromosomes in wheat-rye hybrids of  $F_1$  (amphihaploids) by treating the

plant roots with a solution of colchicine or other chemical reagent; preparation of secondary triticales by crossing octo- and hexaploid forms; and, a biological method, essentially involving pollination of sterile amphihaploids with amphidioploid pollen. Triticales, prepared by these three methods are compared by the authors. The work was done in 1973-1975. The crossing experiments used soft wheat Mironovskaya 808, Avrora, Kavkaz, Krasnodar Dwarf; the pollinator rye Nemchinovskaya 50, Kharkovskaya 60, Saratovskaya 4, and short stem variety EM-1. Colchinization produced triticale which, because of the doubling of its own set of chromosomes, had adequately high cytological, genotypical, and phenotypical stability. Secondary triticale, very fertile hybrids between the octoploid and hexaploid forms, possessed a major advantage of being able to recombine the genes of genetically-different quality genomes of soft and hard wheats. The triticale obtained biologically as the octo- and hexaploid differed in F<sub>1</sub> by low setting and low viability of seeds, apparently due to low probability of formation of functionally viable gametes on the maternal amphihaploid plant, and of different genetic and physiological disruptions associated with absence of polyploid protection in the polyhaploids. This, plus the presence of translocations and various chromosome rearrangements lead to appearance of mutations, decreased bivalent conjugation of the chromosomes and low fertility in plants of F<sub>1</sub> of these triticales. Figures 3; Tables 4; References 17: 8 Russian, 9 Western.

USSR

UDC 633.12.632.111

#### CHEMICAL COMPOSITION AND QUALITY OF BUCKWHEAT GRAIN UNDER UNFAVORABLE TEMPERATURE CONDITIONS

Kiev FIZIOLOGIYA I BIOKHIMIYA KUL'TURNYKH RASTENIY in Russian Vol 9, No 3, May/Jun signed to press 24 Mar 76 pp 273-278

LAKHANOV, A. P., All-Union Scientific Research Institute of Legumes and Groats, Orel

[Abstract] Two varieties of buckwheat--Bogatyr and Mayskaya--were studied in the period 1970-1973 under experimental and controlled conditions. The grain was subjected to cold (up to 15 days) in special climate-controlled chambers, and subsequently grown under natural conditions. Cold has a substantial effect on the entry, synthesis, deposition, and resistance of substances in the storage tissues of the buckwheat grain. This involves an accumulation, in the seeds, of nitrogen, protein, fat, and ash elements and is related to the specific phase of development of the plant. Analysis of these data shows that the amount of accumulating ash elements in the grain grows with a decrease in temperature, an increase in prolongation of the action of the unfavorable temperature, and an increase in age of the

plants. Intensification of accumulation, in the storage tissue, of nitrogen, in the cold, is seen in only two cases--in the period of sprouting and at the time of forming. This type of change in the accumulation of nutrient substances in the grain involves the immediate effect of the cold on the intensity of physiological biochemical processes in the plants, and a lowering of their reparative capacity in the process of ontogenesis. The Mayskaya variety was more sensitive than the Bogatyr. The buckwheat yield is ultimately determined, primarily, by nucleolus content in the grain and its tunicate character. The lower the latter, the higher the nucleolus content and yield of meal. These indices define the technological properties of the grain; under the action of the unfavorable temperatures during vegetation of the plant, the technological properties of the forming grain deteriorate and the temperature effect is especially perceptible in the later stages of vegetation. The tunicate character increases and the nucleolus content decreases. Tables 5; References 8: (Russian).

USSR

UDC 630.112;633.11;612.015.4

STABILITY OF THE PIGMENT COMPLEX AND ACTIVITY OF CHLOROPHYLLASE AS AN INDEX OF WHEAT WINTER HARDNESS

Kiev FIZIOLOGIYA I BIOKHIMIYA KUL'TURNYKH RASTENIY in Russian Vol 9, No 3, May/Jun signed to press 27 Nov 75 pp 266-272

PROTSENKO, D. F., YEMCHUK, V. G., and KOMARENKO, N. I., Kiev State University imeni T. G. Shevchenko

[Abstract] The authors carried out the title investigation with winter wheat of Mironovskaya and Krasnodarskaya selections grown on large plots in the USSR and in socialist countries: Mironovskaya 808, Il'ichevka (frost-resistant variety), Bezostaya 1, Kavkaz and Avrora (non-frost-resistant). The plants were grown on experimental lands of the Scientific Research Institute of Plant Physiology, Academy of Sciences, Ukraine SSR. The pigment system in the Mironovskaya varieties is more resistant to fading and has a larger content of pigments; the bond of the latter to the protein-lipid complex is firmer; the chlorophyllase is highly active. These qualities coincide with the winter hardness of the varieties. The variety-related differences in the pigment complex resistance to lower temperature determine its reaction to the influence of unfavorable aspects of wintering. The findings can help to devise methods of identifying winter resistance and drought resistance in plants. Figures 2; Tables 2; References 19: 16 Russian, 3 Western.

USSR

UDC 581.613.29;633.11:543.865

BIOSYNTHETIC CAPACITY OF THE CARYOPSES AS ONE OF THE FACTORS OF PROTEIN ACCUMULATION IN WHEAT GRAIN

Kiev FIZIOLOGIYA I BIOKHIMIYA KUL'TURNYKH RASTENIY in Russian Vol 9, No 3, May/Jun 77 signed to press 30 Mar 76 pp 244-248

KOLESNIK, T. I., and PAVLOV, A. N., Institute of Plant Physiology imeni K. A. Timiryazev, Academy of Sciences USSR, Moscow; All-Union Scientific Research Institute of Fertilizers and Agro-Soil Science imeni D. N. Pryanishnikov, Moscow

[Abstract] The authors had earlier (1974) studied the reasons which determine the different level of protein accumulation in grain of high- and low-protein-containing varieties of wheat. They identified, as the basic causes of the higher protein, the larger amount of nitrogen substances in the vegetative organs per unit of kernel weight (but not the percentage of its content) due to the greater weight of the vegetative organs with respect to kernel weight, and, also, the increased attracting capacity of the caryopses since, in the high-protein-containing variety,  $^{15}\text{N}$  in large amounts penetrates the caryopses and is included more intensely into the protein. The present article extends that investigation to the role of the caryopses. In the bearded, high-protein-variety 3059-A, there is a more intense penetration of the labelled N into the caryopsis and this somehow involves the presence of the bearding which increases transpiration of the spike of wheat. These data confirm the earlier findings that the increased attracting capacity (of the caryopses of the varieties studied) is not the result of a more intense demand in the caryopses for the non-protein substances for protein synthesis. Although the marked N is included into the proteins, the level of the marked N is also greater in the non-protein fraction than is the case in a low-protein-containing variety. Figures 4; References 4 (Russian).

USSR

UDC 631.81.0.95.337:633.15

EFFECT OF TRACE ELEMENTS ON THE GROWTH, DEVELOPMENT AND YIELDS OF CORN

Moscow AGROKHIMIYA in Russian No 5, May 77 signed to press 5 May 76 pp 89-93

ZADOROZHNYY, G. P., The Pakhtaaral'skaya Experimental Cotton Science Station, Chimkentskaya Oblast

[Abstract] The study investigated the effects of zinc, copper and molybdenum on corn yields in the years 1969-1975 on long-cultivated gray desert soils

that were poor in minerals, using Wagner planters. A calculated moisture content was maintained by weight. The corn hybrid VIR-156 was planted in the planters; in a parallel test in lysimeters variety VIR-338 was used. Results indicated that a significant increase in grain yield occurred in the lysimeter test using zinc. Application of both copper and zinc reduced the effectiveness of the zinc, and copper in general had a negative impact. In the planters, however, copper had a positive effect, apparently since it increased resistance to moisture shortages. The trace elements had a lasting effect on the quantity of leaves except for the copper application, and on growth in the Zn, Mo + Cu, and Mo + Cu + Zn variants. Vegetational mass increased with all applications except for copper. Grain yields increased with applications of zinc or mixtures of the trace elements. Tables 4; References 4 (Russian).

## Public Health

USSR

UDC 616.211--006.6-04

## ORGANIZATION OF SPECIALIZED ASSISTANCE TO PATIENTS WITH MALIGNANT TUMORS OF THE HEAD AND NECK

Kiev USHNYKH NOSOVYKH I GORLOVYKH BOLEZNEY in Russian No 1, 1977 pp 1-4

CHIZH, G. I., doctor of medical sciences, and CHERNYAVSKIY, G. P. and RAYKHMAN, TA. G., candidates of medical sciences, Rostov Scientific-Research Institute of Oncology

[Abstract] The authors study the prevalence of malignant head and neck tumors, as it varies in different oblasts, krays and autonomous republics (comprising from 21.9 to 29.6% of all malignant neoplasma observed within the Northern Caucasus and the Lower Volga region). Owing to the fact that the corresponding group of patients is being treated by a number of physicians of different specialties, the authors conclude that it would be expedient to set up specialized departments for head and neck tumors at the various oncological institutes and the large oncological clinics.

Administrative Territory	Total	Site of tumor					
		Oral cavity and pharynx (including salivary glands)			Larynx	Nasal cavity and para-nasal sinus	Others (thyroid glands, eyes, middle ear, etc.)
		Skin	Lips	glands			
Rostovskaya Oblast	26.4	18.0	4.3	1.3	1.6	0.3	0.9
Volgogradskaya Oblast	24.6	15.4	4.7	1.1	1.8	0.5	1.1
Astrakhanskaya Oblast	21.9	15.7	3.3	0.9	1.8	0.1	0.1
Krasnodarskiy Kray	29.6	22.3	3.6	1.4	1.7	0.4	0.2
Stavropol'skiy Kray	28.6	20.6	4.8	0.9	1.2	0.5	0.6
Kabardino-Baldarskiy ASSR	24.2	17.5	4.0	1.6	0.9	0.1	0.1
Severo-Osetinskiy ASSR	25.4	20.0	2.2	1.1	1.5	0.1	0.5
Checheno-Ingushskaya ASSR	26.5	17.8	3.6	1.6	2.2	1.1	0.2
Dagestanskaya ASSR	26.7	15.0	4.8	2.5	3.1	0.9	0.4
Kalmytskaya ASSR	23.2	10.8	4.7	2.6	2.4	1.1	1.6

Tables 1; References 5: 3 Russian, 2 Western.

USSR

UDC 628.356

CONCENTRATION OF NUCLEIC ACIDS IN ACTIVE SLUDGE AS A FUNCTION OF THE BIOLOGICAL METHODS OF PURIFICATION OF WASTE WATERS

Kiev MIKROBIOLOGICHNYI ZHURNAL in Ukrainian Vol 39, No 3, 1977  
signed to press 7 Apr 76 pp 294-298

SHCHETININ, A. I., Hydraulic Engineering Section of All-Union Scientific Research Institute of Water Supply, Sewer Systems, Hydraulic Engineering Structures, and Engineering Hydrogeology

[Abstract] Concentration of nucleic acids and their ratio in sewer sludge has a direct relation to the source of carbon, concentration of pollutants in sludge, and aeration time of sewage. Nucleic acids present in sludge can serve as reliable indicators of the physiological state of micro-organisms which are sensitive to the above factor. Nucleic acids can be arranged in the following sequence as to their response to changes in the above factors: RNA, RNA/DNA, RNA + DNA, and DNA. The RNA/DNA in this respect is best suited because of its swift reaction to changes in the carbon concentration and the aeration time, while it remains independent on the amount of sludge in the sewage. The composition of the sludge microflora and interaction between different bacteria do not overshadow the effect of the source of carbon, carbon concentration and aeration time on biosynthesis processes. Biological purification methods of sewage can well be evaluated on the basis of concentration of nucleic acids in sewage sludge because this concentration is indicative of the state of microorganisms. Figures 3; Tables 2; References 13: 9 Russian, 4 Western.

USSR

UDC 614.777:628.112:576.858.095.1

SURVIVAL OF ENTEROVIRUS AND ENTEROBACTERIA RELATIVE TO THE CHEMICAL AND MICROBIOLOGICAL COMPOSITION OF THE GROUND WATER

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1977 signed to press 8 Oct 76  
pp 111-113

KOKINA, A. G., candidate of technical sciences; LUKASHEVICH, N. A., and NOVITSKAYA, N. V., Belorusskiy Scientific Research Sanitation-Hygiene Institute, Minsk

[Abstract] A study was carried out on water of the hydrocarbonate class, calcium group, and containing different initial amounts of organic matter from three wells. Well 1 has a very low organic carbon concentration;

Well 2 contains a relatively high amount of humus; and Well 3 is contaminated with farm and domestic sewage. The enteroviruses considered include polio-miyelitis I type Lsc, 2ab, ECHO7, Coxsachie B3 and phage T. E. coli. These showed a consistently higher concentration in the 10°C water than in the 20°C water. The concentrations of these organisms in Wells 2 and 3 are similar and higher than those in Well 1. The enterobacteria considered include Sh. flexneri, Sh. Sonne, Salm. typhi, and, for comparison, E. coli. The concentrations of these showed no consistent trend, either with temperature or with or between the wells. Table 1; References: 2 (Russian).

USSR

UDC 614.777:68.1.315:628.191:637.11

EFFECTIVENESS OF USING A CIRCULATING CANAL TO PURIFY WASTE WATER FROM A DAIRY FARM

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1977 signed to press 11 May 76 pp 94-95

KURTS, V. F., and RASHCHUK, N. L., Chelyabinskaya Oblast, Sanepidstation

[Abstract] On the Tyubuksky dairy farm, a circulating oxidation canal was constructed and tested as a mechanism to purify the waste water. The canal was 1.2 m deep, 3 m wide, total capacity of 374 m<sup>3</sup> and an output of 650 m<sup>3</sup>/day. Parameters of the input water varied within the following limits: temperature 11-24°C; pH, 7.1-11.8; amount of suspended solids, 365-1114 mg/l; total nitrogen 21-32 mg/l; ammonia, 0.7-4.5 mg/l; and phosphorus, 6.4-60 mg/l. Parameters in the canal itself varied within these ranges: temperature, 0-24°C; dissolved oxygen, 0.95-6.6 mg/l; active sludge, 1.1 to 7.8 g/l. Such wide variations resulted in ineffective purification of the waste water.

USSR

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PHYSIOLOGICAL SUBSTANTIATION OF RATIONAL WORK AND REST SCHEDULES OF MEDIUM STRENUOUS AND STRENUOUS WORK IN COMFORTABLE AND ELEVATED AIR TEMPERATURES

Moscow GIGIYENA TRUDA I PROFESSIONAL'NNYE ZABOLEVANIYA in Russian No 4, Apr 77 signed to press 1 Mar 76 pp 19-24

VIKTOROV, V. S., Institute of Railroad Hygiene, Main Sanitary Administration, Ministry of Railroads USSR, Moscow

[Abstract] Investigations were conducted in which examinees operated a treadmill for 1.5 hours with heat production of 3.5 and 5.5 kcal/minute at 15, 25 and 35°. It was found that the present standard rate for rest (7.5  $\pm$  1.0% of the working time) is justifiable for medium strenuous work under comfortable conditions (15°), but work of greater strenuousness or at a higher temperature makes it necessary to increase the rest period-- for medium strenuous work to 14% at 25° and 20% at 35° and for strenuous work to 20% at 15°, 27% at 25° and 40% at 35°. Figures 4; References 7 (Russian).

USSR

UDC 616.22--006.04--058.9352.2

MORTALITY OF THE UKRAINIAN POPULATION FROM MALIGNANT TUMORS OF THE LARYNX: MEASURES FOR THE IMPROVEMENT OF THE OTORHINOLARYNGEAL ONCOLOGICAL SERVICE

Kiev USHNYKH NOSOVYKH I GORLOVYKH BOLEZNEY in Russian No 1, 1977 pp 8-12

PEREBATOVA, M. A., and KRYZHANOVA, V. G., candidates of medical sciences, Kiev Scientific-Research Institute of Otorhinolaryngology

[Abstract] The Soviet era has witnessed a significant increase in the average life-span of the population, but the fact remains that death from the aging process is relatively rare, and that a majority of persons die prematurely, from disease, traumas and physical accidents. In this connection, the study of the causes of death, with due allowance for nosology, is a matter of critical importance. Equally important is study of the dynamics of mortality. The authors made a careful study of data on deaths from laryngeal cancer for the two years 1959 and 1970, relating this information, as far as possible, to the factors of age, sex and area of residence in the Ukraine. Deaths from laryngeal cancer during this period have definitely increased (in proportion to total mortality); this concerns mainly the male population (the female shows a slight decrease). There are significant differences by sex, age and residence (rural vs urban,

and geographical). Four summary tables are given: 1) incidence of laryngeal cancer deaths for all years from 1959 to 1972, with rural-urban breakdown; 2) laryngeal cancer deaths by sex for 1959 and 1970, with rural-urban breakdown; 3) same, with Ukrainian SSR totals; 4) laryngeal cancer deaths by age, for 1959 and 1970, with sex breakdown. A map illustrates mortality by oblast. The authors note the existing achievements in the fight against laryngeal cancer, and also the weaknesses in the present medical system in this area. Suggested measurements for improvement concern organizational techniques, the construction of clinics and hospitals at chosen key points, the involvement of various scientific and planning organs (some to be created), and the retraining of medical personnel to meet the changing needs in this area of medicine.

USSR

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ISCHEMIC HEART DISEASE AND SOME RISK FACTORS IN PERSONS DOING MENTAL WORK

Kiev VRACHEBNOYE DELO in Russian No 5, May 77 pp 72-76

KORKUSHKO, O. V., professor, and KOTKO, D. N., candidate of medical sciences, Institute of Gerontology, Academy of Medical Sciences USSR, Kiev

[Abstract] To determine the influence of heredity, constitution, smoking, excess weight, insufficient activity, increased arterial pressure, and increased tension on the incidence of disease, 785 people, age 40-59, engaged in mental work were studied. The basic purpose was to find cases of coronary atherosclerosis. Examination included 12 lead EKGs and ballistocardiography. The research findings are presented in three barographs. Overall incidence was 24.6%, with individuals in more strenuous mental work experiencing a 27.3% rate and those in less demanding jobs a rate of 21.25%. In 36.3% of the cases detected this was the first detection, showing that the disease is often symptomless. Heredity is also a factor, as found by previous researchers. 55.7% of the individuals with the disease engaged in insufficient physical activities, while for healthy individuals the figure was only 19.9%. Figures 3; References 19 (Russian).

## Radiobiology

USSR

### REMOTE EFFECT OF IONIZING RADIATION WITH DOSES WHICH STIMULATE PLANT GROWTH

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 232, No 3, Jan 77 signed to press 19 Oct 76 pp 718-719

KRYUKOVA, L. M., and NAZAROVA, L. F., Institute of Biological Physics, Academy of Sciences USSR, Pushchino, Moskovskaya Oblast

[Abstract] The remote effect of radiation was discovered (Kryukova, Fiziol. rast., Vol 7, No 2, 1960, p 220) in 1959 in local radiation of individual organs of plants; it is caused by accumulation of inhibitors under the action of high doses of radiation and their dissemination through the plant. Plant phenols under large radiation doses were oxidized to quinones to become endogenous inhibitors; the high doses inhibited synthesis of phytohormones. However, under the influence of ionizing radiation, in doses which activate plant growth, accumulation of gibberellin and kinetin takes place (Kryukova, DAN, Vol 227, No 5, 1976, p 1259). The authors examine the remote effect of small, growth-stimulating doses of ionizing radiation on plants, viz., vegetating beans of the variety Russian Black, 12-14 days old. Dose was 500 r. Change in intensity of division of the cells in periods of growth of the stalk were measured, and are tabulated. Under local radiation of a leaf of the plant, the radiation effect appears in 24 hours. A reliable effect of stimulation of cell division continues in prolongation of observation. However, if the irradiated leaf is removed immediately after being irradiated, the radiation effect is completely absent and intensity of cell division in the periods of growth does not change. The authors suggest that the radiation effect on plants can involve a direct action and a remote action. In doses which depress plant growth the remote effect is due to accumulation of inhibitors (the oxidized phenol compounds); in low, growth-activating doses, transmission of the radiation effect, at later stages, is caused by accumulation of phytohormones, viz., the gibberellin and kinetin. Table 1; References 14: 11 Russian, 3 Western.

Therapy

USSR

UDC 616-009.2:616.8-009.831

DISORDERS OF MOTOR FUNCTIONS IN PATIENTS WITH APOPLECTIC COMA

Kiev VRACHEBNOYE DELO in Russian No 5, May 77 pp 88-94

BOGOLEPOV, N. K., DUBROVSKAYA, M. K., and FILIPPOV, M. A., Second Moscow Medical Institute

[Abstract] The study covered 50 patients, 13 men and 37 women age ranging from 25 to 85 years, 24 were suffering from ischemic insult, 5 from hypertension. Hemorrhagic insult was diagnosed in 26 patients. During the research 22 patients were in stage I coma, 17 in stage II, 6 in III, and 5 in stage IV. The patients were given EMGs. Five case studies are presented in detail and graphs give EMGs. There is a definite correlation between the results of clinical, EMG, and pathoanatomical studies. Motor disturbances depended upon the stage of the coma and the localization of the insult. EMGs enable the precise determination of the disturbances, and are important in determining their severity and the efficiency of various treatment measures. Figures 5; References 0.

USSR

UDC 617.7-001.37-092.9-085.355:577.152.344

FIBRINOLYSIN IN COMPLEX TREATMENT OF EYE BURNS

Moscow VESTNIK OFTAL'MOLOGII in Russian No 3, 1977 signed to press 30 Jul 76 pp 42-45

KOLUSHCHINSKAYA, R. G. and GORBAN, I. M., candidates of medical sciences, and KHITTSOV, G. A., Chair of Eye Diseases, Chair of Pathological Anatomy, Omsk Medical Institute imeni M. I. Kalinin

[Abstract] The authors examined fibrinolysin in the form of a salve and subconjunctival injections applied to 14 experimental rabbits and 35 persons in treatment of eye burns. One group of rabbits was treated with subconjunctival fibrinolysin injections (750 units) and another group with fibrinolysin salve. Two groups of humans were also treated with the injections and salve. A remaining group of 30 persons (in addition to the original 35) were given fibrinolysin treatment on the 10-14-20th days after injury and after conventional therapy had been applied. A variety of agents--alkali, acid, heat, and others--had induced the burns. The ability of fibrinolysin to increase the regenerative activity of tissue was evident. In two cases with severe corneal burns of the third and fourth degree, an increased erosion of the cornea was observed, and treatment was discontinued. Therefore, the authors recommend extreme

caution when applying fibrinolysin to severe third and fourth degree eye burns when there is a possibility of perforation. Due to the overall success of fibrinolysin in clinical conditions, the authors recommend its use for eye burns of light and moderate severity and in later periods of treatment for third and fourth degree burns. Salve is preferred to injection in order to avoid disturbance to the eye. Figures 2; Table 1; References 6 (Russian).

USSR

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#### POSSIBILITY OF FORECASTING RESULTS OF SEVERE WOUNDS USING CYBERNETIC METHODS

Moscow SOVETSKAYA MEDITSINA in Russian No 3, 1977 signed to press 12 Feb 76  
pp 132-135

KOMAROV, B. D., STROKOV, V. A., and KHOVANSKIY, B. F., Moscow Scientific Research Institute of First Aid imeni N. V. Sklifosovskiy

[Abstract] The researchers propose using cybernetic methods for scientific forecasting of the course, outcome, and period of treatment for patients with severe wounds in order to coordinate efforts of the first aid workers and the hospital. Medical data--symptoms, diagnoses, and important evaluations regarding the diseases--are programmed into the computer so that qualitative as well as quantitative information is reflected in the diagnosis, which is based on many case histories. In a test of forecasting results with sample patients, the correct diagnosis appeared in 85% of the cases. In incorrect diagnoses, three problems existed: (1) there was a discrepancy due to defects in medical treatment and insufficient documentation; (2) in some cases later complications altered the outcome; (3) a discrepancy appeared as a mistake in the method of diagnosis. Additional testing was done in prehospital examinations and in the recovery area of the hospital. Again the computer diagnosis was highly accurate. The following were positive results from the computer analysis of medical cases: (1) the information tables used simplified the examination procedure; (2) the diagnosis was useful in formation of criteria for transfer of the patient to the hospital; (3) an optimal recovery procedure was recommended; and (4) the method of diagnosis gives a likely possibility for objective evaluation of the patient and indicates the effectiveness of treatment in the prehospital and hospital stages.

USSR

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CURRENT METHODS OF PREVENTING AND TREATING BURN INFECTION INDUCED BY  
GRAM-NEGATIVE MICROFLORA

Moscow SOVETSKAYA MEDITSINA in Russian No 3, 1977 signed to press 22 Sep 76  
pp 106-110

SOLOGUB, V. K., doctor of medical sciences, YUDENICH, V. V., GRISHINA, I. A.,  
candidate of medical sciences, MOROZOV, S. S., MINKOVA, G. L., and YAKOVLEV,  
G. B., All-Union Burn Center, Institute of Surgery imeni A. V. Vishnevskiy,  
Academy of Medical Sciences USSR, Moscow

[Abstract] The authors examined methods of antimicrobial treatment of  
gram-negative bacterial infection in 50 burned persons. The effectiveness  
of local application of mafenide, betadine, and silver sulfadiazine was  
assayed. There were two groups of people with 15-40% total body area  
burned and with deep wounds of 10-25% body area. Treatment included  
traditional therapy for burn patients--blood transfusions, plasma, albumin  
preparations, and antibiotics. In one group bandages were applied with  
Vishnevskiy salve, and in another with 10% solution or 10% salve of mafenide.  
Bandages were changed every two to three days during two to four weeks.  
Data indicate that mortality and infection complications were significantly  
lower in cases treated with mafenide than those not so treated. Betadine  
salve was tested in a similar experiment and also significantly reduced  
infection. Also effective was 1% solution of silver sulfadiazine in  
combination with gentamicin or carbenicillin. The authors conclude that  
local application of mafenide, betadine, or silver sulfadiazine was able  
to reverse the progress of infection in many instances, reducing mortality  
and enabling more rapid recovery. Mafenide was the most effective sub-  
stance in these cases. Table 1; References 10 (Western).

USSR

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STUDY OF HEART VALVE PROSTHESIS FOR CONGENITAL HEART DISEASE

Moscow KARDIOLOGIYA in Russian No 1, 1977 signed to press 20 Sep 76 pp 9-14

SOLOV'YEV, G. M., Institute of Organ and Tissue Transplants, Ministry of  
Health USSR, Moscow

[Abstract] Prosthesis of heart valves in cases of acquired rheumatic  
damage has been widely practiced, with some 10,000 operations in the past  
18 years alone. For treatment of congenital heart disease, however, its

use has been much more limited, with only 360 operations being reported in the medical literature. The author summarizes the results of 68 cases of valve replacement in patients with a congenital condition. Of these, 35 showed the Ebstein anomaly, 19 the tetralogy of Fallot, 3 valvular and subvalvular pulmonary stenosis, 1 occluded atrio-ventricular canal, 1 atresia of the tricuspid canal, 8 congenital aortal damage, and 1 congenital aortic stenosis and pulmonary stenosis. Results show that the surgical treatment of congenital heart disease, as it is associated with valve replacement, is both a difficult and a little studied problem. In most cases valve replacement in congenital conditions is only a portion of a complex intracardial reconstruction, requiring prolonged artificial blood circulation. It is also highly dangerous. Of 12 patients treated with ball prosthesis, only 3 survived the operation and could be discharged; of those treated with xeno-graft, fully one-half died. Operative procedures are illustrated in 3 figures. Figures 3; References 6: 2 Russian, 4 Western.

USSR

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#### RISK FACTORS IN AORTIC VALVE PROSTHESIS

Moscow KARDIOLOGIYA in Russian No 1, 1977 signed to press 8 Sep 75 pp 14-19

AMOSOV, N . M., ATAMANYUK, M. YU., MINTSER, O. P., TOMASHPOL'SKAYA, B. G.; Kiev Scientific-Research Institute of Tuberculosis and Chest Surgery imeni F. G. Yanovskiy

[Abstract] Data for 117 heart patients (ages 10-59) treated surgically at the Yanovskiy Clinic were fed into the "Minsk-22" electronic computer in order to make a comparison of diagnostic criteria employed (36 symptoms, 114 signs) with outcome of the cases. A statistical analysis of the prognostic value of the most important clinical indices of patients with aortic insufficiency was then made. The authors conclude as follows: i) The leading factors in estimating the seriousness of damage to the cardiovascular system should be the systolic and the diastolic pressure, the degree of heart enlargement, the final diastolic pressure in the left ventricle, and signs of overloading of the right ventricle; ii) Among independent factors, those of greatest prognostic value are the degree of calcinosis of the aortic valve cusps, the duration of the illness, and the period of time from the appearance of subjective symptoms. iii) The duration of the operation and the perfusion time constitute additional valuable information for prognosis of aortic valve replacement. Tables 3; References 25: 9 Russian, 16 Western.

Veterinary Medicine

USSR

UDC 619:614.9:636.5:631.227.2:628.8:697.941:628:513

DIMENSIONS OF DUST PARTICLES SETTLING ON A CASCADE IMPACTOR

Moscow VETERINARIYA in Russian No 5, 1977 pp 37-40

SHANG'GIN, B., PAPOYAN, A., and DODYLEV, YU., Scientific Research Physico-chemical Institute imeni L. YA. Karpov, and DOROSHKO, I., BEZRUKAVAYA, I., and PROKUDIN, A., Ukrainian Scientific Research Institute of Poultry Farming

[Abstract] In solving the problem of ascertaining the degree of bacterial seeding of dust particles, of varied geometric shape, present in the air of poultry-raising buildings, the method of dust-sample selection from the air by the Andersen impactor was tested. A dispersed composition of dust deposits on each of the six stages of the impactor was established in poultry-raising buildings with caged laying hens. The size of the particles was determined on the basis of the value of their projection diameters, the detected particle sizes ranging from 0.5 to 30 microns in size. In each of the stages, the size distribution of the particles in the deposits was normally logarithmic. Dust fractions can be isolated from the air of poultry-raising buildings by means of the Andersen impactor, with an error of not more than 20%, with a size of 0.5-1.5 microns (on the sixth stage), 1.25-2.5 microns (on the fifth stage), and over 2.0 microns (as the sum of particles settling on the first four stages). The degree of bacterial seeding can be determined for these fractions by means of the Andersen impactor. Figures 4; Tables 1.

USSR

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MICROCLIMATE IN PRODUCERS' BUILDINGS DURING ARTIFICIAL AERIAL IONIZATION

Moscow VETERINARIYA in Russian No 5, 1977 pp 34-37

KHRENOV, N. M., Kherson' Agricultural Institute, OSTRENSKIY, YE. S., and KALINCHENKO, N. P., Herson' Biological Factory

[Abstract] In view of the established fact that the physiological state of horses from which serum preparations are produced and the efficiency of their utilization depends directly upon their feeding and the conditions of their maintenance, the influence of artificial ionization of the air upon the formation of the microclimate in producers' buildings is studied. It is found that the use of artificial ionization of the air in producers' stables improves the microclimate by facilitating a decrease of the absolute and relative air humidity, decreasing the concentration of ammonia, carbon dioxide, dust, and microorganisms in the air. Figures 1.

CSO: 1840

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